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GEOGRAPHY NUMBER

Preparation of Geography Teachers

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California: A Type Study of a State

The Culture of Highlands—Realm of the Geographer

The Geography of Recreation

Biogeography

Conservation Education

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The Little Red Schoolhouse Comes to Saipan

Contributions of Geography to American Democracy

A MAGAZINE DEVOTED *to the* SCIENCE, ART, PHILOSOPHY *and* LITERATURE *of* EDUCATION

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GEOGRAPHY NUMBER

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EDUCATION

Vol. 69 SEPTEMBER 1948 No. 1

Preparation *of* Geography Teachers

By JOHN C. SHERMAN
University of Washington,
Seattle, Washington

GEOGRAPHY deals with the earth and man's relationship to his environment. It covers a broad field and brings together information from many areas which have human applications. Many specialists do not understand this peculiar function of geography of tying together topics selected from many disciplines for their importance to man, and are sometimes critical that certain subjects which have geographic applications have been included in geography courses where they are taught by non-specialists.

Contribution to Knowledge

As a matter of fact geography makes an important contribution to knowledge by showing the relationship existing between many diverse subjects which are not clear to most students if the specialties are left in their narrow compartments and not used together. The writer feels that for most undergraduate college students, the broad generalizations that can be made regarding several technical topics are valuable especially since no student can hope to become a specialist in every field. There has been some misunderstanding of the purposes of geography and of the preparation needed by teachers of the subject by workers in other fields, and most of the examples which follow have personally been observed by the writer.

A professor of economics assumed that in order to teach economic geography it is more important that the instructor should have had a broad background in economic theory, such as is provided by the usual major in this field, than that the instructor should possess a knowledge of the complete world coverage in commodity production which a geography major furnishes. Both disciplines are valuable, but the geographer believes the facts about production, distribution, and consumption are more useful than the theory. Likewise, a physics professor may feel that weather and climate should be taught only by a major in physics, and a professor of mathematics may inquire if students can "get anything " from a course on weather without having considerable mathematics as a prerequisite.

In land utilization geographers teach the fundamentals of soils, including soil types, their distribution, and their importance to the food quest, as well as their future maintenance at a permanently productive level. Some geologists and chemists have questioned the value of teaching soils without hours and hours of preliminary work in their respective disciplines.

It might be pointed out to the geologist that the parent material of a mature soil is relatively unimportant in soil use. The chemist might also be told that much of value about soils can be taught without taking up the chemical composition and chemical analysis of individual soil types. The soil specialist will need to study geology, physics, and chemistry, but the human applications of soils which lie in the field of geography, can be taught without the details included in those other sciences mentioned.

Mathematics Needed?

A cartography course—standard in the University of Washington geography department since 1937—is now my pride and joy. Each quarter over a dozen students take professional map-making, using accepted methods and standard drafting equipment. This always appeals to the creative instinct of several, who then go on to advanced cartography, with its opportunity to design maps and experiment with still more advanced techniques.

This spring, however, a letter reached us indicating that any man teaching cartography without a heavy mathematics background including calculus was obviously unprepared. This idea, of course, stems from the original mathematical development of projections and the problems associated with detailed mapping by triangulation.

At present there are over two hundred known map projections and the future discovery of a greatly superior one is quite doubtful. Detailed tables for plotting the commonly used ones are readily available, and are employed by all map-makers. Students learn to design and draw a map in the same practical way it is done by map publishers. Data from many sources need to be presented in graphic and usable form. The best cartography for the average student should stress symbols for relief, symbols for culture, style of lettering, spelling of place names, composition, and balance. These practical considerations were called—delicately—to the attention of the mathematical-minded critic.

This department has been asked whether a geographer who has not graduated from a school of forestry has any business teaching timber conservation, whether a geographer without a degree in fisheries can successfully present the conservation problems of salmon and halibut. Many other phases of conservation of resources seem to be equally suspect: flood control (engineer or hydrologist?), overgrazing of grasslands (botanist?), insect pest control (entomologist?), mineral depletion (geologist or minerologist?), and wildlife (biologist?). It should be pointed out that more conservation courses for the general student are being taught by geographers today than by all other types of scientists combined. The geographical approach is particularly effective when applied to any and all problems of land use.

Extensive Literature

For the purpose of training teachers of geography, the literature on the various continents is so extensive that for most purposes it is not essential that the college instructor have actually visited the continent about which he is teaching. A thoroughly trained geographer is more apt to present well-selected material gleaned from the literature in a way to be more helpful to students than an untrained traveler to the continent can give who depends

on his impressions. For the supervision of theses and research projects on a continent, field experience is of course highly beneficial.

In illustration of the foregoing, the writer has to teach students something about South Africa. How much preparation then is essential for an overall treatment of Africa? The answer obviously depends upon the individual's own experience and training, and his ability to organize and adapt the contributions of others to his purpose.

The war has given our profession another puzzling angle on the question of the "shore leave geographer." A geography graduate who has spent three months in and around Kunming in South China, is supposed by certain scholars to be per se far more valuable as an Asiatic expert than a geographer who has done library research on Asia for ten years. One of our students, while in military service, stopped at Calcutta for three days enroute to the Philippines. Upon his return he was thought by some to be an authority and was invited by a women's club to come and tell them all about India, although he had shore leave for only one afternoon.

Common Misunderstanding

This attitude is common and understandable. If this presumption is true, however, no professor of history, no matter how scholarly and well read, should lecture on the Middle Ages or anything prior to the Spanish American War. If a man who is thoroughly familiar with the literature on the Transvaal province is unfit to teach his students about this area unless he has been there, what good purpose has that same literature served? Geographers who do research and writing hope that others will be able to assimilate that information and pass it on. Why should it be inferred that the man having the greatest original familiarity with the subject is the only one fit to talk about it? Perhaps the most profound service in all education is performed by the appreciative interpreter who often bridges the gap between technical research by the scholar and sound understanding by the student.

Time for Reorientation

It is, obviously, time for a reorientation on basic geographical training. Is it to be as other disicplines dictate, or as geographic common sense dictates? Certainly the latter alternative will, in the long run, benefit the field of geography to a far greater extent than the first. The study of the physical and cultural environment cuts across the fringes of many disciplines, thus giving rise to the type of criticism described. Many seem to be unaware of the fact that geography in itself has a central core or nucleus all its own, but at the same time knowledge of an applied nature must come from geology, anthropology, botany, and many others.

Unquestionably the researcher in theoretical meterology needs the tool subjects of mathematics and physics. The same may be said for the geographer primarily interested in soils. He will require a much wider knowledge of chemistry and geology in addition to the basic geographical facts. Specialization, particularly in graduate work, can vastly improve the individual's ability to teach or do research in some phase of geography. Continental specialities may be enhanced by what might be called microstudies of portions of the continent in question.

The geographer needs to spend as much time in the field as possible.

Even here, however, no man can hope to contribute knowledge equally on every phase of his area of interest. It would take all of several lifetimes for him to become equally "well heeled" on every aspect of the area. Is not the situation for geographers comparable to that in almost every profession? Our fund of world knowledge has become so great that no man can ever assimilate all of it. Therefore specialization in geography is as common as it is in medicine or in any other field, but at the base is the broad general training from which all must constantly draw. Some of the demands that our critics make on geographers' training are as logical as requiring that all bricklayers be thoroughly familiar with the geologic aspects of the clay used for bricks as well as the ceramic techniques of brickmaking.

A Similar Problem

Every conscientious teacher of geography is faced with a similar problem at one time or another. Am I properly prepared to interpret the world to students? Is my earth science background sufficient for modern use in the classroom? How may I increase my effectiveness in presenting it?

Too many of our older teachers have gone from their college training to the schoolroom without even a single course in world geography. Many have confessed that the only work specifically labeled geography was taken in their own school days at sixth or seventh grade level. One woman of fifty who enrolled in our summer school remarked that she had taken sixty hours of work in "how to teach," but had never been able to study any geography in college.

Every institution of higher learning in America which makes the slightest pretext of teacher training should offer a geography course which covers the world systematically, with the proper balance between man and the environment. The course should be so arranged that prospective teachers can secure a comprehensive overview of every major world region. If properly presented by an instructor skilled in the selection of geographic materials, such a course may even provide a rich body of material which can be adapted for classroom use at primary or secondary levels.

Additional Value

The better institutions now go much farther, and offer additional geography of high teaching value, particularly in the continent courses. Many highly successful teacher-training departments regard a sequence such as North America, Europe, Asia, South America, etc., as the core of their contribution to education. We believe that given such a systematic coverage of the continents a student gains an awareness of world geography which he never obtains from a mere sampling of one or two. He becomes familiar, in a general way, with the standard literature available and lays the foundation for any further more intensive work which he may decide to do. There is a growing conviction in school circles that the training of teachers in geography is overdue for attention. The re-planning of school curricula today calls both for more world geography and more world-minded teachers.

The sequence of training might well be similar to the following. First, the general introductory world regional course which can make the student

aware of the complex interrelations between the physical and cultural aspects. The course gives a general world picture, without too great detail. During this introductory course emphasis should be placed on the use of an atlas not only to learn the locations of places under discussion but also to make the student realize what an important tool it can be. With interpretation an atlas contains much of the information that could be found in half a dozen textbooks.

This world regional course might well be followed by two courses, one dealing with the elements of weather and climate, the other with the fundamentals of topography, soils, vegetation, and map use. Fundamental principals of this type will continue to be useful throughout all advanced courses.

The continental sequence is not of significance, although the regional geography of the United States or North America frequently comes next. All of the continents, however, should be included, if possible, in the undergraduate training.

Conservation and Cartography

In addition to the course work on the continents the undergraduate teacher should have some work in both conservation and cartography. The first serves to emphasize some of the problems of resource use and their possible solution. In other words the teacher gains an understanding of the necessity for sensible and complete use of all resources. The second serves two purposes: first it makes possible a more complete comprehension of map structure and the many possibilities for map use, and it also gives the student a feeling for composition which enables him to make and demand more effective maps.

In connection with his geography the average student has much to gain from either geology, anthropology, economics, or political science, depending on which is most valuable in terms of his long-range interests. If the student is most attracted to the physical aspects of his major field, geology, chemistry, physics, or mathematics may provide the collateral training. In any case, work in other fields serves to broaden the geographer's basic knowledge and may enable him to specialize in his graduate work.

Equally Applicable

Although this program is primarily directed toward the undergraduate major and the potential teacher of geography it is equally applicable to any student whatever his major interest may be. Knowledge of the world in general is a valuable part of the cultural background of any citizen. Such knowledge can be applied in arriving at any conclusions or solutions to both national and international problems.

It is obvious that the best training should not end here. For example, those particularly interested in the detailed and accurate mapping techniques for new areas need to obtain familiarity with engineering principles of triangulation and grid layouts which will require a considerable mathematical knowledge. At the same time, however, they must not lose sight of the fact that reconnaissance mapping can, and often has to be done, with few and simple instruments as well as the most elementary of mathematics.

In each special field, however, the teacher and even the researcher require a broad background not only to describe the distribution of phenom-

ena but in addition get at the roots of the problem—why does this pattern occur. Geography should not concern itself with the mere location of a place but in addition should point out the reason for that location and indicate the function which is served.

Although present gaps in the geography taught in the modern schoolroom are more likely to be the fault of school administrators without vision, well-rounded teacher training can also do much to remove them. In many cases the place to put the remedial finger is on the higher educators both in terms of training and the provision of adequate tools to carry on successful teaching. We marvel at the willingness of certain school systems to spend thousands of dollars on play fields, athletic equipment, band instruments, and orchestras while at the same time vetoing an item of one hundred dollars for new maps. In a survey of maps made in a western state some years ago, the only map in one eight-room school was a tattered and dusty political world map of 1897 vintage. It was found in a closet off the janitor's quarters.

Map Replacement

Good maps, used with proper care, need not be constantly replaced. Some people feel that if the political boundaries of a map change even a little bit it should forthwith be discarded. The world has changed and such a map is obviously of no use any more. The idea, of course, is fallacious because the world hasn't changed, the climate is the same, the same people live there, and the same economic activities are being carried on for the same reasons. If the map was good in the first place it can continue to be used with satisfactory results.

The only way to teach geography then, as in any other subject, is to take sound courses and to supplement them by reading and experience. The teacher must have richness of material and accurate perception. He or she must realize that teaching which is based only upon training in methodology but with no geographical material to present is bound to failure. Public school and college teaching must, in order to be effective and stimulating both to the student and the instructor, mean constantly refilling and reorganizing the reservoir of knowledge with new, better, and more accurate information. Libraries are rich in material and getting richer, maps are good and getting better, and more plentiful. The teacher needs to approach the subject by delving into available literature and learning how to present it graphically. In this way only can geography belie its critics and also give to the student and the instructor the satisfaction and stimulation of a job well done.

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Geographic Study Tours *for* Undergraduates

By V. CALVON McKIM
Fresno State College,
Fresno, California

EDUCATION accepts a premise that learning may proceed by one of two routes: development or promulgation of two or more principles or laws from generalities; and application of two or more principles or laws to phenomena within the scope of observation of the individual. Educational practice commonly uses the first method and presents it through lectures and textbook reading, while laboratory work illustrates the second approach. For all earth science groups, especially the geographer, the out-of-doors is also a laboratory. Their field courses are vast practical laboratories which make use of nature's kaleidoscopic displays of actual geographic principles at work on the earth's surface.

It is an accepted procedure to work from the known to the unknown. Applications of facts and objectively observed principles from the known areas to regions of like conditions is a simple step for undergraduate students and can be accomplished in several ways, one of which comprises geographic study tours, either in the immediate home area or in transcontinental regions.

Preparation.—Before undertaking a field trip, the director should himself become thoroughly familiar with the region as a whole. He should carefully explore the route and outline in advance the total experience he expects the students to secure from the study. If visits to industries are planned or features on privately owned land are to be observed, the director must secure permission in advance, especially if an establishment uses very intricate processing methods.

Often a speaker thoroughly familiar with the plant to be visited will be furnished by a corporation to present to the classes information concerning the operation, market, outlet, source of raw material, skills required of labor, capital, outlay, and other facts of a geographic nature pertaining to the industry. This lecture by the factory representative not only motivates the project but in addition, it is an excellent device for integrating community and school relationships.

Further preparation can be accomplished by reading, studying pictures of the area and its industries, and by the use of other visual aid materials. The leader might make up a lecture from slides of his own, selected from snapshots made on the trip of inspection in preparation for the field study.

Equipment and Materials Needed.—Physical comfort is conducive to learning. Adequate seating room in a comfortable motor vehicle of some type should be secured by charter or by

prearrangement for private cars on the part of the students. Absolute assurance that all vehicles can maneuver all parts of the route is essential. Many studies have failed because of interruptions due to detours, blind alleys, grades too precipitous for ascent, and a lack of space for parking while on the observation grounds. Changes in routing are often necessary to avoid these handicaps.

Each participant should be given an outline of the itinerary. This should include a map of the route and additional material for guiding students in acquiring as much information as possible in the time allotted. Well-chosen questions may be inserted in descriptive material to intensify observation and encourage discovery of relationships on the part of students. Information acquired by individual discovery provides a satisfaction similar to that of an explorer upon the attainment of his objective. Student lethargy never becomes a problem if the teacher remembers that intelligence can be insulted with too minute an explanation of the phenomena under consideration.

A notebook is not essential on short field studies. However, if the instructor wishes to make statistical comparisons, some method must be devised to collect data from which later analysis can be made. Individual choice should dictate the type of record each participant keeps. For strip studies a ruled sheet of any size will do. For making cross-sections, graph paper is desirable. The students will devise some alternative or substitute if all the special materials cannot be secured.

Even though undergraduates are young adults, it is well to direct attention to the type of clothing to be worn. Girls should be encouraged to wear sturdy shoes and slacks, or garments that lend themselves to climbing fences, scaling cliffs, passing safely among rotating wheels and spinning belts of processing plants. Boys normally wear appropriate clothes for field work. If a marked change of weather conditions is anticipated enroute, appropriate additional clothing should be included in the equipment. The weather forecast will answer the question of proper dress for the short field study. High morale and student interest go hand in hand with physical comfort.

Safety Measures.—The instructor's responsibility for safety of participants is no greater on a field trip than in routine classroom procedure. If negligence can be proven to have caused a student's injury in a classroom or on the school ground, the injured has cause for a damage suit. Teaching out-of-doors involves no more obligation than teaching indoors. All common carriers are insured against the ordinary traffic hazards and all private car owners should be. The administration should have a list of all participants and the itinerary, in case of emergency, and it is imperative that clarification of possible liability be secured from the school administration. A list should be made, the carrier investigated and extra caution exerted to eliminate possible negligence—then the director should proceed with confidence on his field trip.

The Natural Environment.—Geographers in general concern themselves with area. A major objective of instruction in the subject is to promote appreciation of and skill in analyzing general landscapes. This is best accomplished by field studies which illustrate many geographic principles

and demonstrate relationships often neglected by the arm-chair geographer.

Relief and Topography.—Of primary concern in any field study is the demonstration of the influence of relief and topography on the distribution of cultural phenomena. Relief refers to the difference in elevation between the highest and lowest points in the immediate vicinity. A few practice estimates should be made and then measured as a check. The relief of an area may be high or low. If it is high, the area likely served as a barrier to roads and migration. If it is low, it may have been an important trade route, or a center of settlement.

Topography refers to the type of slope and is indicated by such terms as gentle, rolling, and rugged. It influences the location of transportation routes and the boundaries of cultivated fields, to cite two cultural conditions. In addition, it is a major factor in determining the speed with which erosion will attack the surface of the land and the bedrock below.

The degree of steepness of the slope accelerates or impedes these processes also. Often there is a relationship between density of vegetation cover and the degree of slope. Such observations and interpretations may be made by students after only limited training. Success in perceiving such scientific correlations may lead to an enthusiastic attack on other elements to be studied in the field.

Soil.—Another important element which affects the distribution of cultural forms is soil. If the field study covers several regions, distinguishing characteristics between the great classes of soils can be observed and measured. For any one region, however, observations should be limited to profiles and horizons. In studying these two aspects, it should be kept in mind that they will serve as models for recognition of minor subdivisions throughout a short or long field trip. Artificial exposures may be found in road cuts and natural exposures in gullies.

It is seldom necessary or advisable for the field class in geography to excavate a sufficient depth to expose a complete profile in which the three major horizons can be seen. As a basis for correlating the cultural pattern of any unit with its natural background, an understanding of the soils is most helpful. The response of the inhabitant is immediate and direct, as contrasted to the long time and indirect influence of many other natural conditions that affect the use of the land. Soil maps and soil bulletins are available for many parts of the United States. These can be used for checking the accuracy of field observations when the group has returned to the classroom.

Climate.—The general relationship of climate to features developed is often not objectively apparent so that observations here must be of an indirect nature. The climatic elements involved in a regional study extend over such a long period of time that they can be studied only after records of ten years or more have been collected. However, the climatic conditions influencing an area are reflected in the natural vegetation. Objectively, then, climatic influences can be studied with sufficient accuracy by field observation for the undergraduate student to make general comparisons between contrasting regions.

The weather for the period of observation is objectively measurable, but the weather over a period of time which in the aggregate makes climate, cannot be observed. It is well, however, for participants to observe and record conditions from time to time which can be measured either by observation or with simple instruments. Cloud forms and estimated cloud heights, wind direction and estimated velocity, are all aspects of field observation that in the aggregate will serve to illustrate conditions which over a long period of time have influenced not only the natural vegetation, but the type of human shelter. In some cases the raw materials of industry and commercial operations are a response to these elements. They may furnish an index to the demands the region will have to make on other parts of the world to supply goods which, because of this influence, cannot be produced locally.

The writer has been amazed more than once at interpretations presented by students after a few days of observation of the influences of climate and weather. On a tour conducted near the critical 20-inch rainfall line, students observed from one day to the next in traveling from west to east that haystacks disappeared and barns with large hay mows became a major feature of the landscape. The cause was correctly interpreted as a climatic influence. The limited precipitation on the dry side of the 20-inch isohyet did not spoil the hay, whereas the increased precipitation on the wet side of the same isohyet would ruin much of the hay were it left in stacks on the ground.

This phenomenon had various ramifications, in addition to its influence on the buildings essential to an efficient farmstead. The direction of the prevailing winds of summer were noted to have an important influence on their arrangement. The barn and corrals were placed leeward of the house. The farmstead shelter belt indicated to them the direction of wind in regions having severe winter storms. In regions where annual wind velocities were high, many windmills were noted.

Minerals.—Aside from soils, the content of the land can be objectively measured by a simple classification of the minerals that appear in even the smallest rock fragment found at the surface. The inclination on the part of individuals to collect specimens can be utilized in this part of the field study. Fragments of rock are available in nearly all parts of any area. The minerals constituting the rock can be seen and usually identified. Perhaps clay pits and stone quarries are available for a visit. Forests of oil derricks can give a clue to fluid minerals coming from far below the surface.

Gravel procurement plants are numerous in all regions. Only a brief visit is required to determine why road builders prefer one type of gravel to another. Usually with but little help the undergraduate is able to determine that a gravel with quartz as the chief mineral constituent is preferred to one consisting mainly of feldspar or hornblende.

Stratified rocks become objectively evident in their influences on land forms in any region. Eminences such as low mountains or high hills on the landscape can usually be attributed to resistant rocks whereas the depressions

generally correspond with the outcrops of weak rocks. The geologic history of the region can be brought to light by observations of extensive life forms as they are represented by fosiliferous remains in the rocks of the area.

These phases of undergraduate field studies have received much greater emphasis than many others of equal importance. Many field studies consist principally of rock and mineral identification, or analysis of the content of the land.

Vegetation.—Objective observation of vegetation forms should involve only the general variations that occur as a result of the influence of the physical background and its relation to microclimatic variations. The wide differences in regional influence can be measured. The number of plants per square foot, square yard, or square meter will indicate a contrast in which students are definitely interested. The relative values of forests for timber can be illustrated by rough cruising of random samples.

Samples of the three great classes of plants may be found on some of the field trips. Numerous examples of the xerophytes exist in regions west of the 20-inch isohyet. Interspersed with these are the hydrophytes and mesophytes where stream margins or subsurface irrigation occur. However, by count it can be objectively determined which class dominates. It has been the experience of the writer that students at all levels are interested in making the necessary measurements to determine accurately the ratio of one type of plant to another and the comparison of one region to another.

Animal Life.—Observation of animal life is the most difficult element in the natural environment to measure objectively. Certain of the indigenous forms will be observed, but generally it is difficult to distinguish regional influence in this connection. The number of animal units per unit of area can be arrived at by a rough method of observation. This holds true chiefly in the grazing lands of the sparsely settled parts of the country. It is almost impossible to determine the units in the densely populated regions. Here only broader aspects of the animal industry can be measured.

Erosion.—Features resulting from this agency will indicate to even the most elementary observer that it is both good and bad. It may result in obvious loss of slope land soil through recognizable gullies. On plowed slopes it results in sheet erosion, the stripping off of a thin layer of soil over a wide area. All eroded material is deposited elsewhere. If it does not enter a stream, it remains on the land nearby and becomes a rich, fertile alluvial deposit recognized in the field by the quality of vegetation and lack of definite soil horizons in the profile. More often, though, erosion removes the top portion of the soil and carries it to a stream, which in turn deposits it far from the region. Sterile subsoil, distinguishable by its color, and steep-walled gullies usually result from erosion. This nonfertile soil produces low crop yields and gulleying creates waste land. This offers objective evidence of the need of conservation practices. Students should suggest methods of control learned by prior observation or study.

Wind erosion may be observed in suitable localities. Dust storms may

be encountered or evidence of wind deposition along fields and roads may be seen. The presence of shelterbelts and strip farming would indicate that wind is an active agent even though it wasn't blowing strongly during the tour. Wind erosion can be prevented by several methods, which should be suggested by the students.

Cultural Phenomena.—Thus far observation of natural phenomena has been presented as the chief activity of field studies. The undergraduate will usually have less difficulty with this phase than with observations of cultural phenomena. However, several relationships may be seen at once, such as that between population distribution and topography, between quality of farmsteads and fertility of soil, and between type of crop and the natural conditions of the region.

Population.—Statistics show that the density of a rural agricultural population is closely proportionate to the yield of the dominant crop of the region. Objective evidence of population density may be had by determining the number of people per square mile. Areas of good soil usually occur in regions where relief is very low. In these regions the roads generally follow the section lines established by the Congressional Survey. Students soon learn to recognize the distance represented by a half mile each side of the road because of the rectangular pattern of such areas. The automobile or bus speedometer records the linear distance accurately.

If the distance chosen is ten miles, the student counts farmsteads from the road back one half mile on either side to obtain the number of farmsteads in ten square miles. Statistics from the United States Census Bureau indicate an average of five per family in rural America. The student then merely multiplies the number of farmsteads by five (assuming each shelters a family) and divides by ten, the number of square miles in the survey, to get the average density per square mile, which is close enough for reconnaissance purposes.

Land Use.—The question of how the land is used and whether its use lends itself to economic progress or decay, can be measured by field methods. Sample land use checks consisting of at least one from the core of the area under consideration give the concrete evidence of its use. This can be computed statistically by undergraduates. Several means may be used to measure accurately and rapidly two cultural phenomena: percentage rank of the various crops and the quality of farmsteads. The former is a clue to the type of agriculture and the latter gives evidence for determining the general economic level that can be attained under the influence of the natural conditions prevailing in the region.

For this check the tenths of a mile divisions on the speedometer must be used by the students. If the number of tenths of a field ending along the road is determined along a ten-mile linear stretch, it is obvious that one has made a check of the use of land through a strip one hundred tenths in length. Therefore the total of tenths cultivated to any one crop in the measured ten miles indicates the percent of the land devoted to it in the strip studied.

This may be done for both sides of the road if enough individuals are

present, and the average of all checks will come within 1 or 2 percent of the crop census report (which in many cases is in error to an equal or greater extent). Conclusions can be drawn from this data, which the student later analyzes, regarding the type of farming, the agricultural region, whether the economy is based on diversification or a single crop, and other pertinent facts, depending on the time allotted and the point of view of the individual. Other less obvious conditions and influences may result from interpretation of the statistical data collected.

Conclusions.—Field studies do not solve all the problems of teaching undergraduates. They are valuable adjuncts to routine classroom instruction, and have long been used to illustrate principles related to the distribution of natural phenomena. The relationships between homogeneous natural phenomena of an area and the cultural conditions developed thereon can be seen as well.

Endorsement by more than two hundred past participants of both short and long distance tours conducted by the writer indicates that people in many occupations make use of the methods developed for measuring the distribution of natural and cultural phenomena in all walks of life. School administrators, teachers and employers in other occupations will find that the field methods of the geographer will be useful to most people in diverse occupations.

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California: *A* Type Study *of a* State

By RUTH E. BAUGH
University of California,
Los Angeles, California

THE early Spaniards recognized two Californias—Baja or Lower California and Alta (Upper) California. The latter, with additions to its original area, comprises the present political unit we know as the state of California.

In a popular sense, California represents different things to different people: some visualize mountains like the High Sierra, others plains, as typified by the Sacramento Valley; some a vast forested area such as the Redwood Coast, others the California desert exemplified by Death Valley or the Colorado Desert. Such divergencies of concept are not unexpected, for there are, in truth, many Californias, and each has a marked individuality imparted by its distinctive geographical conditions.

The state of California lends itself admirably to the regional approach. Its landscape forms are prominent and greatly varied, and its culture runs the gamut from primitive to complex urban development. It is a large state (158,000 square miles), second only to Texas in area. The latitude (32 to 42 degrees north) encompasses a wide range, and in combination with great altitude differences, produces many climatic types.

Certain major land forms create six distinctive regions of California. The *Great Valley* occupies one-half the length of the state. To the east rises the *Sierra Nevada,* and to the west lie the *California Coast Ranges.* The southern extension of the coast ranges together with coastal zones are known as *Southern California. Northern California* consists of the Klamath Mountains on the west and the Volcanic Plateau in the east. Eastern and southeastern California is the *Desert Region.*[1]

The Coast Ranges

For more than two centuries the coastal fringe was the only part of Alta California known to Europeans. Place names attached to headland, bay, and mountain bespeak the early activity of Spanish explorers and the later colonizers. When permanent settlements were established, beginning in 1769, favorable sites along the shore and in coastal valleys became centers of the earliest European-derived culture. The architecture of mission, home, and public building, constructed before the American occupation, reflects Spanish origins. Even in twentieth century California the Spanish flavor, particularly in the coastal region, is apparent. Two other features distinguish this province: the localization in its ports of far-reaching commercial activities, and the development in close proximity to the coast

1 The reader will add to his understanding of this geographical description if he will provide himself with a map of California or western United States, preferably one showing land forms (relief).

of the state's largest centers of population.

The Coast Ranges are characterized by long parallel ranges and intervening valleys, aligned in a northwest-southeast direction. The mountains are not high, averaging only 2,000 to 4,000 feet, although at the northern end a few peaks rise to 8,000 feet. The valleys are long and narrow and terminate at the coast in bays or alluvial plains.

The Santa Clara Valley is located south of San Francisco Bay and is a veritable garden spot, famous for apricots, prunes, wine grapes, and vegetables which are sold fresh, dried, bottled, and canned in the markets of the United States. The Salinas Valley also produces a variety of products in the long valley stretching from Santa Margarita in the dry southern half where stock raising takes the lead, to dairy products and summer lettuce localized in the cool foggy plain near Monterey Bay.

North of San Francisco Bay, the Russian River valley opens southward, while the Eel River widens northwestward. Together they form a long groove utilized by highway and railroad from San Francisco Bay to Humboldt Bay. The Redwood Highway cuts through magnificent stands of redwood trees along the Eel River, and the northward stretch between Eureka and Crescent City. Heavy winter rains and summer fogs favor forests. This resource supports the lumber industry which here attains more than local importance.

Moreover, the great natural beauty of forest and coast and the mild pleasant climate are contributing to a substantial tourist industry. The fish caught in and near Humboldt Bay, dairy products, flowers, and bulbs find a ready market in San Francisco and Oakland. Other than the processing of forest products, manufacturing is small.

The population of the Coast Ranges is sparse and is noticeably concentrated in the valleys near highways. The bordering ranges are steep sloped and often rugged. Inaccessibility produces isolation, and they are shunned except where mineral wealth occurs, which consists chiefly of quicksilver and petroleum.

The coast proper where mountains meet the sea, is generally steep and inhospitable. There are few plains immediately adjacent to the sea large enough to support more than fishing villages or lumber ports. Three bays —Humboldt, San Francisco, and Monterey—and their narrow plains are the only considerable centers of population in the northern and central Coast Ranges. Monterey was the most important city in California from 1770 until 1849. Today it lies off the beaten track of the major transit lines. It is, however, a charming city. The attractiveness of nearby Carmel and Santa Cruz mountains give the whole area a large tourist trade. Otherwise the economy is based on a considerable fishing industry, and on farming and dairying.

The metropolitan area on San Francisco Bay is second in population of Pacific coast cities. Geographic and historical factors have played a part in its growth. One of the earliest settlements established on the California coast, San Francisco experienced a great impetus during Gold Rush days. Its geographical location at the outlet of the Great Valley and on one of the world's finest natural harbors have given it a dominant position particularly in Pacific Basin trade. Its pic-

turesque situation and the many points of interest in the vicinity of the Bay make it one of America's most colorful cities.

The Sierra Nevada

The Sierra Nevada is essentially a primitive region. It contains scarcely 3 percent of the state's population and no real cities. The great elevation of its crest creates a barrier which limits travel across the range. And yet this region was the magnet that drew people from the four corners of the world in the rush to California in 1849, a movement which ushered in the Americanization of the state.

The Sierra Nevada is a great mountain 400 miles long, extending from the Volcanic Plateau in the vicinity of Feather River southward to Tehachapi Pass. The uplift and tilting to the west of a huge block of the earth's crust produced a long gradual slope to westward and an almost vertical drop facing the Desert Region on the east. From Lake Tahoe (6,242 feet) southward the altitude steadily increases to Mount Whitney (14,495 feet), then lowers as it approaches the south end of the range.

Although a single mountain block, the Sierra is intricately dissected by powerful rivers. Awe-inspiring canyons have been carved into the granite block by the American, Tuolumne, Merced, Kings, and Kern rivers, to name only a few. Mountain glaciation has produced bold, impressive landscapes. Deep U-shaped canyons and leaping waterfalls, ampitheater-like cirques near the mountain crest; the work of ice also contributed to the formation of lakes and meadows.

An extensive forest about halfway up the west slope is an added feature to the attractiveness of the Sierra. The massiveness of the range and great difference in elevation from the dry foothill zone to exposed alpine heights creates a belted arrangement of vegetation types ranging from scattered shrubs near the Great Valley floor, through forests to a zone of stunted windblown trees near the upper tree line, beyond which plant life cannot survive.

The main timber belt of sugar and ponderosa pine, fir and incense cedar has a well-developed lumber industry, increasing in output from Yosemite to the latitude of Lassen Peak and Mount Shasta in northern California. In isolated groves at altitudes of 4,000 to 7,000 feet grows the *Sequoia gigantea,* the big tree, monarch of the earth's flora. In the sublime natural setting of the western Sierra, three national parks, Yosemite, Sequoia, and Kings Canyon, are centers of recreation. And beyond the confines of federally operated parks both slopes of the Sierra Nevada have hundreds of summer camps along good fishing streams, around the countless lakes and meadows. Recently the popularity of winter skiing has brought into prominence such accessible mountain areas as Donner Summit and Badger Pass. Recreation, unquestionably, is the most widespread of the Sierra's organized activities.

Water is its greatest resource. Copious precipitation as rain and heavy snow in the central and northern Sierra feed countless streams. West-slope rivers supply the thirsty farmlands of the Great Valley. The largest cities of the state draw Sierran water through long aqueducts to metropolitan centers. Water from the Tuolumne River supplies San Francisco; the Mokelumne serves the East Bay area, while Owens River, an east-slope

stream, fills the Los Angeles aqueduct. The generation of hydroelectric power for use on farms and by municipalities in California is of the greatest significance economically.

Although gold mining was the industry which first brought the Sierra Nevada into prominence and attracted a large population, it is today a minor industry. The placer mining of "the days of '49" has been superseded by large scale deep or shaft mining centered in towns like Jackson and Grass Valley. Gold production has declined, but the glamour of the old days lingers in the foothill belt of the Mother Lode country where picturesque hamlets, some thriving, others decadent or in ruins, recall the lively days of California's Gold Rush.

The Great Valley

No greater regional contrasts can be found in California than those existing between Sierra Nevada and Great Valley. Striking as are contrasts in elevation, slope and surface expression, climate and natural vegetation, the cultural differences are even more pronounced. The economic development of the Great Valley is the story of agriculture, crops, farm labor, and water problems, of the rise and growth of market towns and cities.

The Great Valley is a level plain 400 miles long occupying the depression between uplifted Sierra Nevada and Coast Ranges. It is one of the world's notable plains and contains 12,000,000 acres. A pair of rivers, the Sacramento and San Joaquin, drain the lowland from north and south, respectively. They join in the common delta and flow to San Francisco Bay through the only sea-level break in the Coast Ranges, Carquinez Strait. A third division, Tulare Basin, lies in the extreme south end of this vast lowland.

Geographical conditions favor agriculture. Soils are deep and highly varied, ranging from coarse sandy types near the mountains to dark rich peat in the delta. Winters are cool with occasional sub-freezing temperatures; summers are very hot with frequent temperatures above 100 to 110 degrees. Rainfall is too light in many areas for crop production, and as it occurs only in winter, the long, hot, rainless summer demands that diversions of water from the Sacramento-San Joaquin system be utilized for irrigation. Practically all irrigation water comes from the Sierra Nevada, for only a few weak streams reach the Valley from the Coast Ranges. The sources of the Sacramento tap high mountain areas of the Northern California region, and strong tributaries enter from the northern Sierra. Tulare Basin in the south receives the Kings, Kaweah, and Kern rivers.

The fortuitous combination of level land, good soils, high summer temperatures and normally adequate irrigation water, to say nothing of human initiative and energy, have helped to create in the Great Valley the largest continuous block of farmland in the state, in area one half the cultivated land in California. Crops, in the main, are produced on a commercial scale. They tend to be localized in areas favoring profitable production.

Oranges are planted in the eastern foothills for air drainage on cold winter nights; rice culture is centered along the Sacramento River near Colusa; apricots, figs, and raisin grapes find late summer drying conditions excellent around Fresno; truck crops, as potatoes and asparagus, flourish in the black soils of the delta.

Alfalfa, wheat, barley, cotton, olives, nuts, melons, wine grapes, to name only a few of the major crops, find their way to local markets to be sacked, baled, boxed, and packaged for nation-wide distribution.

Market towns serve to collect, process, and ship the produce of the tributary area and supply growers with their needs. Redding, Red Bluff, Chico, Woodland, and the great center, Sacramento, are major market centers in the north; Stockton, Modesto, Merced, and Fresno in the San Joaquin area; Visalia, Tulare, Delano, and Bakersfield in the south. Sacramento, state capital, has superior advantages as a major market center because of excellent position on the navigable Sacramento River. Stockton's situation on Stockton Channel of the deepened San Joaquin gives it direct connection with foreign ports. Inland Fresno is well connected by rail and highway with the great markets around San Francisco Bay and southern California. Bakersfield, southernmost of Valley cities, is a center for the extensive petroleum fields of Tulare Basin and for vast farming enterprises. Its situation commands four passes through the enclosing mountains.

A continuing agricultural production in the Great Valley hinges on a guaranteed water supply. The building of dams and extension of canals, shifting of Sacramento River water to the lower San Joaquin Valley, and of San Joaquin River water to water-poor Tulare Basin are now carried out in the Central Valley Water Project.

Northern California

North of Great Valley and Sierra Nevada lies high country with rugged, lofty ranges in the west and lava flows in the east. The Southern Cascades, a volcanic ridge, trends northwest through the center, continuing the direction, if not the features, of the northern Sierra. Many volcanoes crown its summit; most spectacular is Mount Shasta (14,350 feet), whose snow-capped cone is a prominent landmark throughout northeastern California. Lassen Peak, within Lassen Volcanic National Park, still exhibits phenomena of receding activity, for this volcano was active as recently as 1915.

West of the Cascades is the rugged Klamath region where range beyond range extends to the coast. High wooded mountains and deep canyons isolate this area; it seems a world apart, truly another California when set beside the well-tilled Great Valley. Heavy rains drench the forested ridges of Salmon, Scott, and Klamath Mountains and maintain the volume of Trinity and Klamath rivers. East of the Cascades the lava plateau is interrupted by basaltic ridges, segregating flattish areas. The forests of ponderosa pine are replaced in the extreme northeastern corner of the state by sparser tree growth and a cover of sage.

Culturally, Northern California is similar to the Sierra Nevada. The population is small in numbers and scattered with few large communities. Unquestionably the forest is the greatest resource and lumbering the greatest industry. Gold mining continues to contribute an appreciable income, but stock raising and general farming employ far more people. Like the Sierra this area is another of the unspoiled, primitive regions of California. The recreation business is increasing yearly and has possibilities of development.

Desert California

The desert region of Eastern California encompasses a vast area extending from the Oregon line to the Mexican border. It experiences the highest temperatures, lowest humidity, and smallest annual rainfall found in the United States. A high mountain barrier on the west and southwest shuts out the moisture that might make this interior region a more even-tempered, better-watered land. Five to 10 inches of rain fall annually in favored areas, while scarcely more than 2 to 5 inches are recorded over much of the southern desert.

Dry air, meager and undependable rainfall, sizzling summer temperatures, and cold, desiccating winter winds are not conducive to plant growth. One misses here the broad-leaved trees of humid lands. Instead, a sparse and stunted growth, thick leaved and thorny, gives a monotonous tone to the landscape. Sagebrush in the north, creosote bush in the south are dominant, but mesquite and smoke tree, yucca, and cacti add interesting forms in the southern desert.

Lacking a verdant arboreal cover, the barren land forms are bold and sharply outlined against the horizon. General elevation is high, and the surface is broken by prominent ranges, often parallel, and isolated craggy buttes. Mountain blocks enclose trough-like basins onto whose sandy floors temporary streams drain from the surrounding highlands. Sharp, near-vertical slopes enclose the basins, such as the 11,000 foot scarp from Mount Whitney to Owens Valley, or the even more precipitous drop from Telescope Peak (11,045 feet) in the Panamints to the sink at Bad Water (minus 280 feet) on the floor of Death Valley.

The California desert is only the western part of the large region known to early pathfinders and fortune hunters as the "Great American Desert." Few were the travelers who chose to remain in this forbidding land. Not until the considerable mineral wealth was discovered did mining draw a small and transitory population. Gold and silver are still mined while copper, lead, zinc, tungsten, and vanadium total an appreciable percentage of the state's metal production. The recovery and refining of salines—borax, potash, soda, and salt—is an industry which supports several communities: Trona on Searles Lake flat, and Boron in the western Mojave Desert.

One might least expect to find intensive agriculture in such a natural environment as has been pictured. Yet crop production is the great industry of the southern valleys. Where water can be procured, the desert blossoms, for the unleached soils are generally fertile. Pumped water, from underground accumulations, is utilized in the alfalfa fields of Antelope Valley and the date groves and vegetable gardens in the Coachella Valley.

In areas where it is feasible to secure water from streams whose sources tap high mountains, agriculture is favored. Such an area is Imperial Valley, southernmost of desert California's crop producing districts. Its winter lettuce and early summer melons are marketed in Atlantic-seaboard cities, while hay, grain, dairy produce, flax, grapes, and vegetables find ready market in nearby Los Angeles. The recently completed All American Canal functions, as did the predecessor ditch, as the life line of Imperial Valley in

carrying water from the Colorado River. Future extensions will increase the irrigable area in the Imperial Valley, America's largest irrigation district, and will also carry water to Coachella Valley, northwest of the Imperial. The Coachella and Imperial valleys, centering on the Salton Sea, contain the largest concentration of population found in the California desert area, and support large market towns such as Indio, Brawley, El Centro, and Calexico.

Capitalizing on the natural features that impart individuality, the desert is rapidly becoming a winter recreation area. The grandeur of its stark landscape under changing lights and colors, warm sunny winter days, absence of severe storms are features that attract pleasure seekers to Death Valley, Twentynine Palms, and Palm Springs. Desert tourism is related also to the close priximity of the southern desert to metropolitan Los Angeles and to the fine system of highways connecting the two regions.

Southern California

Southern California exhibits features of all the other regions of the state. It is probably best known, least understood, and certainly the most complex geographically. Its area is smallest, its population largest, and it contains the West's biggest city. Essentially the region is a coastal plain backed by high mountains. Its coast line is long. Climate is Mediterranean in type—mild sunny winters with occasional rainy periods of short duration, and warm, rainless summers.

Differentiated from the northern and central Coast Ranges by direction of mountain trend and arrangement of valleys, the mountains are so arranged as to create a semicircular rampart on the north and east, separating Southern California from the desert in the rear. The mountain barrier lies north of the region in the vicinity of Santa Barbara éastward to Los Angeles, and east of the Riverside —San Diego area. Mountains thus enclose the lowland and fend off, somewhat, the low winter temperatures of the interior. More important is the heavier precipitation their elevation produces (5,000 to 11,000 feet). They are significant sources of water which accumulates in underground basins, and also of small streams that cross the plain.

The lowland stretching from mountain base to the sea is discontinuous, divided and subdivided into many valleys by low mountains and upfolded hills. These were the valleys—San Fernando, San Gabriel, San Bernardino and many more—that became early centers of agriculture, and are now becoming suburban appendages of growing metropolitan centers such as Los Angeles and San Diego.

Agriculture in California dates from the plant introduction and crop production begun in 1769 by the mission fathers in fertile coastal valleys. After the disestablishment of the missions, agriculture languished. Cattle and sheep raising became the almost exclusive activity on the vast ranchos, supplying hides and wool to traders who carried on a desultory commerce during the thirties and forties. But severe and long-continued drought eventually wiped out the industry. The American conquest, the break up of large land holdings, expanding population and, particularly, the building of railroads brought

about an economic revolution in Southern California.

Increased local demand for farm produce, extension of irrigation, introduction of new crops such as citrus fruits and their export to eastern markets transformed agriculture. By the turn of the century, farm production was the leading source of income, and it still maintains a high place in spite of the expansion of industry. Looking down upon the coastal plain from vantage points in the mountains, a vast irregular checker board of irrigated green—orchards, vineyards, gardens—covers the lowland. Tawny gashes reveal the channels of dry washes and sandy stream beds winding toward the sea. We must bear in mind that the vast agricultural production of Southern California is supported, except for a few dry-farmed crops, by artificial applications of water, irrigation.

The decade 1910–20 saw great changes. Industry and trade expanded enormously in tempo and output. The opening of the Panama Canal in 1915 stimulated West Coast commerce. Improvements in the harbors of San Diego and Los Angeles increased their ability to handle the expanding trade. Petroleum production in the Los Angeles and Ventura fields was accelerated, contributing eventually to the major tonnage export from Los Angeles. Continuing population increase enlarged local demands for manufactures and furnished a labor supply for industries. Today the production of airplanes, motion pictures, automobiles, tires, furniture, and clothing ranks high in a long list of manufactured items. From stock raising to intensive agriculture, to industry and trade, economic development spans barely a century.

Tourism is a long-established business in Southern California. Following the completion of the two transcontinental railroads in 1885, winter visitors began to arrive. Large hotels were built and recreation was organized. Climate and the natural beauty of the area are still potent attractions, and in recent years Hollywood has provided additional lure.

Conclusion

The writer has taken advantage of the geographical diversity of California to demonstrate a method of approach in considering the geography of a state. Obviously the regions do not function independently any more than California functions apart from the states comprising the larger Pacific Coast region or the western United States. Synthesis must follow the analysis. Each region must be considered in its relation to all the others, as well as to the whole area involved. When the whole is viewed in relation to its parts, unity emerges from diversity, the resultant of mutual interactions.

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The Culture *of* Highlands—Realm *of the* Geographer

By MARION E. MARTS

Department of Geography, University of Washington, Seattle, Washington

LOOK to the mountains, wrote the poet, and none could heed his advice with greater profit than geographers. Mountain geography has been a neglected field in the American geography curriculum. This neglect is difficult to understand in the light of the student interest and enthusiasm the subject generates, and the wealth of geographic material encompassed. The dramatic character of mountain environment, the sharp definition of physical controls, the picturesque quality of highland cultures provide the ingredients for what can be one of the most popular and successful courses in college geography.

Effect on Man

A famous geographer once said that people, like water, tend to flow from highlands to lowlands. It is true that man, pressed by the need to produce his daily bread, has tried to turn his back on the inhospitable heights, but throughout the ages they have had a tremendous impact on him, physically and mentally.

As early as the Middle Ages Alpine spas and baths had become popular as resorts and convalescent centers. The imagination of the nineteenth century was fired by mountain-climbing exploits in the Alps, climaxed by the ill-fated first ascent of the Matterhorn in 1865. Pike's Peak symbolized the West to many an eastern lad and, later, when the cog railroad had been built, the trip to its summit was a "must" with visitors to Colorado.

Of the world's scenic wonders none have attracted more attention than the great mountains. Man has variously regarded them: with superstitious fear, with reverence, with passionate admiration. Among them he has taken refuge from enemies. The Kabyle tribes of the Algerian Atlas have long since forgotten why they dwell in cramped villages perched on the crests of ridges, but their ancesters, who fled pell-mell before the Arab, knew that survival depended on finding vantage points in territory difficult to invade. Spartacus the gladiator took refuge in the crater of Vesuvius in 73 B. C. and there organized his army of rebellious slaves which was to keep mighty Rome in turmoil for two bloody years. Elsewhere too the Romans had occasion to reflect on the strength of mountain defense positions: they fought one Alpine tribe for eighty years with arms and tribute to obtain safe passage for their merchant caravans.

Mountain Barriers

In their role as barrier, the Alps deflected Mediterranean culture westward, so that it spread into Germany late and secondhand by way of Gaul. The Himalayas screened India from the Mongolian influences which flowed

eastward to flank the barrier and sweep down the great north-south valleys into Burma. The low, damp, forested hills stretching across northern peninsular India repelled the plains-loving Aryans and preserved the Dravidian culture of southeast India. The quotation "Africa begins at the Pyrenees" is a familiar statement of the effect of barrier ranges on the spread of cultures. In many ways man's attentions have been drawn to the mountains and his actions influenced by their presence. Yet too often in the maps of the mind highland areas—sparsely populated or even complete wildernesses—are blanks.

A New Course

To help fill some of these blanks, mountain geography has been newly added to the list of courses taught at the University of Washington. Though strictly an elective, enrolment has already increased to the point where a second section has been added. Offered at the freshman–sophomore level, the course has attracted juniors, seniors, and graduates with majors in everything from advertising to zoology.

One geography major took the course because he expects to work for a tourist bureau, an economics student because as a child he was fascinated by the highlands of his native Greece, a former coast guardsman because he became interested in peaks and glaciers while stationed in Greenland, a navy veteran because on a secret behind-the-lines mission in Fukien Province his curiosity was aroused by the differences between the Chinese of the hills and those of the coast. Among the former mountain troopers, several are members of the National Ski Patrol; one is an Austrian-born ski instructor who elected to major in geography after taking the mountain course; another works summers as a packer-guide for oil exploration parties in Alaska. Mostly, however, students enrol in the course because of their interest in mountain recreation. On week ends they ski, hike, and climb and like devotees of these sports the world over they spend their college years trying to make week ends meet.

Mountain-minded Students

Quite logically students in the West are mountain minded, especially on the University of Washington campus, dominated as it is by Rainier and the other fine peaks of the Cascade and Olympic ranges. Likewise students in New England, New York, and on down the Appalachians are close to highland areas which arouse interest, stimulate curiosity, and provide fine opportunities for field trips. South Dakota has the Black Hills, Missouri and Arkansas have the Ozarks and Ouachitas, and Oklahoma, in addition to sharing a bit of these two uplands, boasts the Arbuckles and Wichitas. Some states of course must be content with a more detached interest in mountain cultures and environments, but certainly this interest is keen, to judge by the flood of pilgrims from the great agricultural midlands heading, at the end of harvest season, for the Rockies with their promise of relief from the heat and topographic monotony of the plain.

Although the instructor has a ready-made student interest on which to capitalize, that is far from the only advantage. If it were, such a course certainly would not be justified. A sane environmentalism, free of the pitfalls of determinism, can be effectively illustrated where man has pushed close to the limits of subsistence, where harsh conditions severely re-

strict his range of opportunities in earning a livelihood. Thus mountains—like deserts—provide ideal laboratories for the study of environmental influences.

In the mountains physical conditions are so sharply defined and human responses so logical that the beginning student readily sees the relationships. The contrasts between sunny and shady slopes, the sharp demarcation of timber line and of snow line, and the effect of altitude on temperature are clearly observable elements of the highland landscape. Likewise abrupt changes in slopes and in exposure to wind and sun result in correspondingly abrupt changes in vegetation and land use. Such responses are obvious to students long before they are trained to the point of interpreting crop patterns in terms of soil textures.

Occupance Patterns

Occupance patterns based on the exploitation of a single resource are especially common in highland areas, and these single-economy units are ideal for the illustration and analysis of resource-impact on an area. Climax, Colorado, and Bingham Canyon, Utah, are examples of the many interesting mountain mining towns; Estes Park Village and Lake Tahoe typify resort developments; Skykomish, Washington, a sawmill settlement deep in the Cascades.

Often there has been a sequence of economic activity, as for example Ketchum, Idaho, once a mining town at railhead and now a resort town dependent on Sun Valley. Single-industry centers grow and, where geographic conditions are favorable, their functions multiply. These are often on the piedmont, where they can tap intersecting trade routes and thus command the agricultural resources of the plain as well as the mineral or other resources of the highland. Such a city is Denver, originally a supply center and headquarters for the mines of the Front Range, but which quickly developed agricultural and political functions. In every case, however, because of the environmental limitations which include the warping and funneling of trade routes, the developmental pattern is clear cut, logical and readily recognized.

In the lowlands, on the other hand, despite a wide spread of an approximately homogeneous land resource, striking differences in occupance occur which can often be explained only by reference to factors such as accidental early start or other historical circumstance. As a result the young geographer may fail to see the influences of the environment, which are present but obscured. It is only where environment strictly limits economic choice—of crop, of road route, of townsite, of occupation—that the beginner can grasp the implications of environmentalism. The highland environment provides this lesson-sharpening limitation.

Effects of Isolation

Striking also are the socioeconomic effects of isolation, and of paucity or depletion of resources, for example, the Appalachian highlanders and the ghost towns of the Rockies. It is this clarity that makes mountain geography so effective in developing a feeling for landscape and the ability to observe geographic factors. Just as a range of mountains stands clearly outlined on the horizon, so the elements of environment are outlined and underscored in mountain areas.

In presentation, the approach found most effective has been a combination of regional and topical, with the individual mountain systems forming the natural regions. The variety and richness of the available materials and of subjects to present are overwhelming; the problem is one of selection and elimination. Throughout, the stress is on human geography, physical elements being introduced solely to interpret human response. Certain mountain ranges are "naturals" for the illustration of specific problems and these provide springboards for the presentation of principles and concepts.

Topographic Influences

The Appalachian Mountains offer a good example of topographic influences on American development. At one time the futility of expansion westward across this barrier was actually argued in Congress! Trans-Appalachia, it was contended, could never be assimilated into the United States of the Atlantic seaboard because of the barrier range. But as land hunger increased, the tide of migration rose so high that it breached the barrier in a dozen places.

The Pennine Chain in England illustrates the effects of mineral deposits on piedmont cities. The Alps are ideal for presenting mountain agriculture, transhumance, and the effects of pass routes on trade, culture, and growth of cities. Oberammergau's Passion Play exemplifies an unusual response to special environmental conditions which include an inadequate agricultural resource, a favored location on an early trans-Alpine trade route, the early development of an artisan economy which further encouraged cultural contacts with the outside world, and yet sufficient isolation to preserve from the materialism of the industrial age a significant remnant of the medieval mind with its interest in religion and drama.

The physiological effects of altitude are appropriately discussed in connection with high mountaineering in the Himalayas. Even industry pays tribute to rare atmosphere. Special inducements and medical precautions must be provided at the 11,000-foot Climax, Colorado, molybdenum mining camp to attract and hold workmen. Three centuries ago the Spaniards faced the same problems in working the high Andean mines. Tibet offers fascinating examples of high-altitude cultures, as well as interesting caravan trade and barter economies, especially along the Chinese border zone. The problem of unification of China is better understood in the light of its many barrier mountain ranges.

In the Pacific Basin mountain geography is everywhere: the agriculture of Java, the terrific eruptions of Krakatoa and Katmai, the high mountains of New Guinea, the terraces of Luzon, the coral atolls themselves, the amazing contrasts of windward and leeward Hawaii, the Aleutian Chain. Alaska provides great wilderness ranges, little known and little utilized, as well as some dramatic sea-and-mountain settings for such towns as Valdez, Cordova, and Skagway.

Typical Construction Problems

In the mountains of British Columbia are good examples of railroad and highway construction problems: the choice of route for the Alaska Highway, the Selkirk barrier to the Trans-Canada highway, the Connaught Tunnel under Rogers Pass, and the spiral tunnels of Kicking Horse Canyon.

Outstanding also are the resort developments in the railroad belts through the Canadian Rockies—Banff, Lake Louise, Jasper—as well as the spectacular Columbia Icefields Highway connecting the two belts, which leads the tourist through some of the finest mountain scenery on the continent. Altitudinal zonation of vegetation and land utilization is nowhere better observed than in the Andes, as is the importance of highland areas in the tropics.

Specialized Uses

In the United States the mountains of the West illustrate well most of the specialized uses of mountains: as recreation and nature exhibit areas in the national parks and elsewhere; as timber sources and forest reserves; as watersheds and run-off regulators feeding hydroelectric plants, irrigation canals, and city water mains; as sources of minerals; as grazing land in a "national forest type" of transhumance; and as ranch and farm land in the sheltered valleys. Throughout the West irrigationists and power men plan their summer campaign against aridity only after the results of the April 1 snow survey have been collected.

University of Washington students have close at hand the Cascade Range —a fine example of a climatic barrier and water power. The heavy winter snowfall of the Cascades means, among other things, avalanches, which are a very real problem to skiers who have been marooned when slides block highways or who even have seen comrades snatched away and buried. The physiographer, of course, finds in mountains many examples of special land forms and earth processes: folding, faulting, glaciation, peneplanation.

This list is far from complete but it does suggest the wealth of possibilities in mountain geography. The student who started the course with an interest only in the recreational aspects of mountains finishes with a fair comprehension of many standard geographic concepts: adjustments to environment, altitudinal zonation, physical climatology, world climates, land utilization, conservation problems. He has a good survey of highland areas as a frame on which to build further knowledge of world geography. An unlimited variety of collateral reading is available, and in many areas excellent field trip possibilities exist.

Widespread Neglect

That such a course, capitalizing on strong student interest, can make a valuable contribution to the geography curriculum is no surprise; the surprise, rather, is that it has been almost completely neglected by American geographers. It has not heretofore been offered in American universities. The United States has produced only one survey of mountain geography, Peattie's work,[1] which provides an excellent introduction to the alpine literature of Europe. Unfortunately Professor Peattie's book neglects American highlands almost completely and is not entirely satisfactory for the beginning geography student.

Atwood[2] has come closer to a study of American mountain geography but his book is limited to the Rocky Mountains and is more of an appreciation than a survey. Much excellent work has been done by a number of scholars

1 Roderick Peattie, *Mountain Geography* (Cambridge: Harvard University Press, 1936).

2 Wallace W. Atwood, *The Rocky Mountains* (New York: Vanguard Press, 1945).

dealing with specific problems or areas but the ranges of the United States have not received the attention accorded those of Europe by geographers. Indeed, some of the best work by United States geographers has been done on highland areas abroad.[3]

Undoubtedly this situation will be improved as the American geographer gives increasing attention to highland environments and cultures. No other scientist is so well equipped to interpret mountain cultures. The interests of physical scientists are highly specialized and seldom deal with more than limited aspects of man's adjustments and problems. Among social scientists, historians and anthropologists have made notable contributions, political scientists have concentrated on problem areas along disputed boundaries, and economists and sociologists have taken little interest in mountain cultures per se.

The geographer, on the other hand, with his feeling for regions as functional entities, his training in analyzing all the significant elements of the landscape, and his unique approach, which is a synthesis of the physical and cultural factors of an environment, is unquestionably in a favored position for such study. Particularly valuable are the techniques of graphic presentation—maps, physiographic diagrams, moving pictures, and photographs—which the trained geographer is able to use effectively.

A Further Advantage

A geographer who is also a trained mountaineer has, perhaps, a further advantage, especially in areas where students are often week-end skiers and alpinists. No one can have a better feeling for mountain terrain than the man who has tramped over it with rucksack and ice axe. No one knows better the meaning of high-altitude insolation than he who has climbed a snow slope in the heat of the day and shivered in a high camp immediately after sunset.

The mountaineer develops a keen and very personal interest in geology when he is climbing on loose, friable rock, or traversing a talus slope which lies near the angle of repose. He who with heavy pack labors up a switchbacking trail watches the vegetation closely to estimate his altitudinal progress and listens carefully for the shrill note of the whistling marmot with his cheering news that the timberline campsite is not far away. Such special background is desirable, true—but it certainly is not essential. We do not expect all geographers who discuss forestry to have been loggers, nor should mountain geography be limited to alpinists.

An Introductory Offer

The subject has great possibilities as an entrant into the geography curriculum for students from a wide range of disciplines. These students prospect through the catalogue and, motivated by an intense but unacademic interest in mountains, try the sample. Many find it assays high and return to dig deeper into geography. Whether or not they return, they have been exposed to geographic thinking and will carry some away as part of their intellectual accumulation. For the advanced student the subject provides a unifying core for work at the seminar level. As a stimulating field with dramatic appeal and intellectual value, mountain geography is a rich but overlooked resource able to make an important contribution to the geography curriculum.

3 *e.g.*, Isaiah Bowman's studies in the Peruvian Andes.

The Geography *of* Recreation

By TIM KELLEY

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MAN is essentially an outdoor animal as far as his biological and physiological needs are concerned. The supplying of means for the satisfaction of these needs among a highly urbanized people is one of the fundamental reasons for the development and reservations of recreational lands and waters. The modern highway, the automobile, the amount of leisure now at the disposal of the public, and the physical and cultural values to be derived from travel and outdoor recreation, appreciated as never before, all give to the recreational areas of the country a unique place in the life of the nation.

The Recreation Industry

The recreation industry is one that offers economic compensations as well as those recreational and aesthetic values which are more intangible but are needed to maintain the morale of a people. During the past few years the industry has emerged as a full grown business occupying an important place in the social and economic life of the United States. It is an industry in which the American people spent nearly fifteen billion dollars, (about 9 percent of the national income), in 1946 for outdoor recreation, travel goods, and services.[1] Of this, some eight to nine billion was spent on travel and vacations, seven million people alone visiting the national parks.[2]

The recreation industry is one which offers a tremendous market for many businesses and manufacturing firms throughout the country, and is an industry which provides the major source of income for a large number of communities in many sections. Its importance in our economic affairs is apparent when we consider that recreational expenditures in 1946 were as great as the combined value of all goods produced by the iron and steel, the automotive, and textile industries in the entire United States in 1939. In 1946, over 12,500,000 fishing and hunting licenses were sold to followers of this type of outdoor recreation. It is not surprising then, that 160 city, area, and state groups are planning to spend $7,500,000 in 1948 in an effort to attract tourists and vacationists.

Why is this industry important? What are the principal types of recreational areas? What are the geographical factors which have influenced the location of the industry?

The Geographic Locators

Land Relief.—A variety of elevation is one of the important determinants in recreational land values. Persons planning vacation trips are

1 Research Department, Curtis Publishing Co., October, 1947.

2 Although golf, amusement parks, sports, etc. are also forms of outdoor recreation, it was thought best to omit these from this article. Market, or the proximity to large populations would seem to be the chief locator for this group. Golfers alone, spent over $100,000,000 in 1946.

prone to seek opposite altitudes. Change of environment is of great importance as a physical refresher, for monotony is a curse to recreation. Maximum varieties of scenic interest are to be found in the more rugged areas, where plains provide only minor variations. Plains are usually associated with only one life zone, whereas mountain ranges frequently include as many as four or more. There are many points which could be used to illustrate the importance of land relief in the recreational picture, but this is hardly necessary since such values of mountain lands are universally recognized. It is unfortunate that such areas so high in recreational value generally are remote from large population centers.

Water Resources.—Lakes, streams, and oceans are factors of the utmost significance in the recreational scheme, both because they contribute beauty to any outdoor scene and because of their high value for active participation. It should be borne in mind that lands which do not have a sufficient supply of water have a low recreational value, just as they have a low forage value. Whereas the great arid areas of the Southwest have a recreational value, such use necessarily is concentrated to a relatively few cases. New York, recognizing the value of water resources, has gone so far as to make water recreational resources a primary requisite in the selection of state parks.

Seacoasts are both unique and matchless in their recreational value. Concentrated use does little to efface nature, for with the next high tide every evidence of occupance is effaced. Twenty-one of the forty-eight states have ocean frontage, totaling approximately five thousand miles. These beaches are one fortunate instance where a recreational resource is found in proximity to the centers of human demand, as 45 percent of the total population, or sixty million persons, live within 55 miles of the seacoast and the Great Lakes. A weakness which should be remedied is that a comparatively small portion, only 1 percent, is now in public ownership for recreational use.

Certain it is, that pleasurable outdoor recreational experiences require favorable climatic conditions for no one enjoys himself in an atmosphere of physical discomfort. Many outings have as their principal motive the search for a pleasurable climate.

Rainfall.—A climatic factor which affects and in many ways definitely determines the seasonable value of certain regions for recreational use, is rainfall. For example, in the coastal section of the Pacific Northwest, the recreational advantages of relatively mild temperatures during the winter months are offset by long, continued and often heavy rainfall which that region normally receives at that season. On the other hand, light rainfall in the summer is a factor in making this section one of the most delightful summer playgrounds of America; sparse rainfall in winter contributes much to the recreational popularity of the Southwest. The Great Basin and southwestern states contributing 8 percent of the land area of the United States have an annual rainfall of less than 10 inches. Much of this area, warm during the winter, and having a high percentage of sunshine, offers exceptional recreational possibilities.

Snowfall.—The growth of skiing during the past decade, as evidenced by an expenditure of $150,000,000 an-

nually by winter sports lovers, is another example of the position climate attains in the recreational picture.

Ski areas must have reliable snow of sufficient depth for the terrain and there must be sufficiently frequent new snow to keep the skiing surface usable. Minimum elevations where such characteristics are more common vary from 6,000 to 8,000 feet. New England, located on the leeward side of the continent, is an exception. Exposure is important because on it depends not only the amount and durability of the snow but also the texture and the condition of the skiing slopes and trails after packing.

Topography, too, has its place since it is the controlling factor in type of slopes and trails, and avalanche hazards. The U.S. Forest Service alone has developed 254 winter sports areas in the national forests of the Rockies, Cascades, Sierras, Arizona, New Mexico, New Hampshire, Vermont and the Lake states. Such private developments as Mount Washington, Lake Placid, Sun Valley, the Arizona Snow Bowl, and Aspen, owe their fame to those natural conditions which have made them the "Meccas" of winter sports lovers.

Sunshine.—Areas having a high percentage of sunshine in the winter months are particularly attractive for recreational purposes. Because in the United States such regions are remote from centers of greater population density, the majority of the people cannot reach the sunshine at the time when most needed.

Any area having 60 percent or more sunshine during the cool season may consider itself as possessing an important factor in determining its popularity for winter recreational use. Most of the Southwest, southern California, Colorado, eastern Wyoming, the Panhandle of Texas and Oklahoma, western Kansas and Nebraska, and southeastern Montana are included in this category. However, all do not possess other attractions which, acting in conjunction, determine popularity of an area. Portions of Arizona and southern California receive from 80 to 90 percent of their total possible sunshine during the winter months.

Humidity.—Humidity, which is one important factor in determining the rate of evaporation, enacts a role in determining recreational desirability. High humidity, a factor producing high sensible temperatures, is responsible for the fact that the Chesapeake Bay region is not an ideal summer playground. Low humidity makes an important contribution to the winter advantages of such regions as the Southwest and Great Basin. Again, the principle low humidity regions are rather unavailable because of their remoteness.

Temperature.—Generally, high temperatures are an adverse factor in summer and a favorable one in winter. Tourists, seeking contrasts of temperature, travel many millions of miles every year. Popularity of mountain areas in the summer, and of the southern regions in the winter is thus partially determined.

The summer season is the period of the year during which the greater part of the people seek outdoor play, whether it be an extended vacation period or a shorter week-end trip. At this time, areas having an average July temperature of 60 to 70 degrees are desirable for summer vacations. In this classification fall northern New England, much of New York state, areas within the Appalachians, the tier of northern

states from Michigan westward, and large areas in the western states. Those places having a July temperature between 50 and 60 degrees are at even a higher premium. Such playgrounds occur throughout the Rockies, the Sierra Nevadas, and the Cascades. At this time the people from the South, the East, and Midwest, where average temperatures run from 70 to 90 degrees, seek more desirable temperatures. Here altitude and windward coast location act as more important controls than does latitude.

Many people who are not winter sports addicts seek the warmest areas accessible during winter months. All of the Gulf states, southern California, and Arizona contain areas where the average January temperature is between 50 and 60 degrees. These states offer great recreational attractions to the citizens of the colder, northern states. The southern half of Florida with a January mean of 60 to 70 degrees, and convenient as it is to the densely populated areas of the East, is a popular winter playground. Unfortunately, most regions of densest population, with only limited recreational resources available, have unfavorable summer and winter temperatures. Those who would seek cool summers and warm winters must travel great distances.

Flora and Fauna

Flora and fauna provide the living interest without which an area is recreationally incomplete. Imagine an area which is complete as to topography, water resources, and climatic elements, but which is without plant and animal life. Such a mental picture should give some idea of the importance attached to the presence of native vegetative and animal life.

Flora.—The value of attractive vegetative covering is too well known to need detailed discussion. In addition to the aesthetic enjoyment derived from wild flowers, natural coloring, etc., much entertainment is had by those who gather edible berries, nuts, mushrooms, and so on. Certain vegetative types have exceptional recreational value because of their unique characteristics. Notable among these are the cacti of the southern deserts, and the interesting plants of the southern swamps.

Forests and wooded areas provide great opportunities for recreational use, offering cool shady retreats from summer heat, scenic values, rich botanic interests, and varieties of bird and animal life. These forest regions of the United States may be divided into six principal groups: the Northern, Central Hardwood, Southern, Tropical, Rocky Mountain, and Pacific Coast forests. It is within these forests that the Forest Service has set aside seventy-seven wilderness areas containing approximately 14,269,000 acres and some 5,000 recreation areas totaling over 100,000 acres. The presence of the above is as basic an element in selecting land for recreational use as topographic variety, water, and favorable climate. Fortunately for the densely populated Atlantic Coast and Great Lakes, these are regions of persistant tree growth. Where tree growth is possible, areas of relatively small extent, perhaps only a few acres, have high recreational values.

Fauna.—In the geography of recreation, the abundance, variety, and distribution of native animal life are important. Probably no resource has suffered more from encroachment of civilization, through the destruction of

the natural environment and extinction by over hunting. Such wildlife requires extensive native habitats, few of which are free from the penalties imposed by special interests. To maintain and enhance this resource, a land policy must involve first, increased reservations where there are no encroachments by other users, and scientific management aimed at sustained production rather than strict preservation. It would appear that with almost half the area of the United States classified as essentially incapable of tillage, that wildlife should have ample scope. Certain it is that wildlife exerts a pull on tourist populations. Pound for pound, the bears of Yellowstone probably have a higher economic value than any other form of wildlife on the North American continent. Fishing and hunting are among, if not the leading, outdoor recreational pursuits.

Areas representing cultures of preexisting peoples are also important in the recreational scheme. They should be mentioned as locators in a geographical article for cultures are largely the expressions of the physical environment. Such archeological sites of widespread interest, including historic homes, mound sites, and even complete villages are widespread in distribution and have drawn hundreds of thousands of visitors every year.

The Conflict of Interests

One cannot discuss the location of present and future recreational areas without dealing with the competitors for these lands who so often destroy their attractiveness. Such "conflict of interests" is paramount in the history of resource conservation.

Every one is aware of the large amounts of industrial wastes that are constantly being discharged into our water resources, where they not only seriously effect aquatic life, but also water and shore line recreation. For example, if all the waters of the nation could be freed from such pollution, the liberated resource would probably be greater than the combined resources of the national parks. Lumbering is a necessary form of land utilization but it seriously depletes an area's recreational value. Stock grazing, too, has an adverse effect on recreational values.

It should be obvious that recreational use of natural resources must be correlated with other forms of land use, except within areas where recreational advantages indicate the highest use. The creation of parks, forests, and other forms of recreational land has had to overcome much opposition. Instead of being considered as the highest type of land use, it has often suffered competition with private land uses which often outbid the public recreational interests. This strongly suggests the need of a federal agency whose responsibility it should be to call attention to recreational resources, particularly when other uses of such resources would needlessly destroy their recreational value.

What adds to the complexity and needs of the recreational industry of the United States is the uneven distribution of population. This is illustrated by the fact that the Mountain division has 3 percent of the population and 28 percent of the total land area, whereas the New England–Mid-Atlantic–North Central states comprising 14 percent of the total land area, has almost 49 percent of the total population. Recreational planning cannot be successful unless it takes into account this discrepancy.

Biogeography

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THE manifestations of life on earth are marvelous and mysterious. Life raises its manifestations out of the world of Newtonian physics to a different plane and although the difference between man and animal and plant is mainly one of consciousness, the close bond of being alive groups them together and establishes lasting and insoluble relationships. Man has always shown a very special curiosity for life. Although there have been times when mechanistic attitudes threatened to ignore what is most characteristic in all living organisms, namely the unique features of life itself, there can be no doubt that the "life sciences" will ultimately prove to be the most valuable of all for the preservation of our species and its spiritual growth.

The Study of Life Forms

Several important life sciences have developed to a point where truly impressive investigations can be carried on, often with far-reaching results. Biology, botany, zoology, anthropology, and medicine are the most important of these. Geography, to, that heteromorphous science, is deeply interested in the manifestations of life. Does not the landscape receive many of its most significant features from the vegetation that spreads a softening mantle over the stark outlines of rock and stone? No analysis of a landscape or a region can claim to be complete without considering the life forms that animate it.

The variety of life forms is so great as to defy any comparison of which the human mind is capable, but in geography an individual species is of less significance than the associations of species, not each separate plant but the groups that as a whole make up the plant formations of which the vegetation is composed. Animals, too, are often important features of the landscape and their distribution is frequently linked closely to the characteristics of vegetation.

Biogeography deals therefore above all with vegetation and its associated animal life and enquires into the nature and the causes of their distribution. Man should not be excluded from the considerations of biogeography but as anthropology and ethnology have gradually developed into independent fields of investigation, the study of biogeography has become focussed more and more on vegetation and its associated fauna.

There is, however, a close relation between botany and zoology on the one hand, and geography on the other. These sciences meet in biogeography where their scientific results are merged. Pure taxonomy and laboratory physiology must forever remain incomplete, if they are not linked to conditions as they occur in nature. And it is the natural conditions, their characteristics and their world-wide distribution, that geography describes and explains.

The combination of biological and geographical knowledge makes it possible to attack intelligently the problems of plant and animal distribution. To this must be added the fields of paleontology and geology, for the environment is not alone responsible for the peculiar arrangement in which vegetation and fauna are grouped today in all continents and oceans. The combination of biology, geography, and paleontology gives biogeography a very complex character. But this is in keeping with all life sciences and not astonishing, when one considers the nature of life.

The Biosphere

The distribution of life on earth is uniform in only one respect: all over the globe it is limited to a narrow layer, which coincides roughly with the surface of the earth. Within a few meters, life in the soil becomes very scarce and quickly disappears altogether. In the ocean, animal life occurs to a depth of several kilometers. In the air, both birds, mammals, and insects are largely limited to the first 400 meters, although on rare occasions birds have been observed as high as 2 kilometers above the ground.

Actually there is hardly a place on earth where there is no life. Even the snow and ice fields of polar regions and the glaciers of high mountain ranges are not entirely without living beings. The occasional occurrence of red snow-algae has always attracted the attention of scientist and layman alike, because these tiny plants give the snow a distinctly red coloration. Bacteria, spores, and even seeds are carried by the wind to practically every place on this globe, and warm-blooded animals have been found on Mount Everest at an altitude of seven kilometers (22,967 feet).

But even the most extravagant exceptions shrink to insignificance, when compared with the size of the earth. The greatest depth of the ocean is only about 10.5 kilometers, a minor figure compared with the earth's diameter of 12,740 kilometers. The lowest layer of the atmosphere, the uppermost layer of the lithosphere, and most of the hydrosphere combine to form the biosphere, or the sphere in which all life on earth is found. The biosphere is the space to which biogeographical investigations are limited. Indeed, it is the biosphere to which any and all geographical studies are confined. The biosphere is therefore of supreme importance for the entire science of geography.

Within the biosphere the life forms vary enormously in their characteristics and in their distribution. For instance, plants are largely limited to the land surface and the uppermost layers of the hydrosphere, while animals can extend their habitats throughout the ocean and can temporarily invade the atmosphere to a considerable degree. Life forms, especially plants, show a close dependence on environmental features and are therefore abundant or scarce with varying conditions. Animals, on the other hand, are much freer from such environmental fetters. And yet, it is the green plants which are alone able to utilize inorganic matter, and above all the energy from the sun, and make it available for various physiological processes and functions. Animals must live on green plants, directly or indirectly, and thus become inescapably dependent on them. Green plants are therefore of superior importance in the wide realm of the biosphere and their distribution is the cornerstone on which the structure of biogeography is erected.

Plant Ecology

The distribution of plants is a problem of a very complex nature and is not completely understood. Individual plants as well as units of vegetation respond directly to climatic features such as heat and moisture; they respond also to the physical and chemical nature of the soil. Plants are permanently exposed to climate and soil of their environment and must adjust themselves to them, if they are to complete their life cycles successfully. This adjustment has been carried very far, and biogeographers have learned to read the nature of the landscape and even to a certain extent its history, by analyzing the vegetation of the area. Even the best and most continuous climatic and edaphic studies do not supply the information that is readily discernible to those who understand the implications of the vegetation.

Biogeography and Land Use

For the purpose of land use and land planning, colonization and settlement, biogeographical knowledge is therefore of inestimable value. Land use includes such basic human activities as the raising of domestic animals, the production of crops, and the exploitation of forests. Even the great fisheries of the world are intimately linked to the occurrence and distribution of plant life, be that in lakes and rivers or in the oceans.

A knowledge of biogeography is also valuable to anyone who wishes to inform himself on the nature of an area in which he cannot spend much time; the vegetation of the landscape is like an open book for those who have learned to read it. In a very vague and undisciplined way every farmer accumulates some biogeographical knowledge of his district and applies it to his seasonal tasks. He does not build his house among the willows because they tell him the water table is high and will flood his cellar every spring. He does not time the sowing of his seed on the basis of thermometer readings but on the appearance of leaves and blossoms of the vegetation about him, for they are surer indications of the season's advance than any other information he may secure. To the trained geographer vegetation can reveal more about the nature of the landscape, its economic potentiality, and even its history than any other feature or combination of features. For a thorough regional analysis a knowledge of biogeography is therefore indispensable.

Development of Biogeography

The formal introduction of biogeography as a science is usually accredited to Alexander von Humboldt (1769-1859), whose famous journey to the "equinoxial regions" of America had such far-reaching effects on the enlightenment of the scientific world of his time. After him came de Candolle, Wallace, Grisebach, and above all Schimper. In the United States biogeography has been treated as a stepchild and few botanists or zoologists have shown geographical understanding. The most eminent exception is probably the botanist Forrest Shreve whose clear insight into the regional nature of vegetation and his ability to reason geographically have made him the father of American biogeography. In Europe, biogeography has long held an important position in the broader field of geography. At last, however, there is an increasing recognition of the value of biogeography in the United States also.

There can be no question that there is a real need for more information on biogeography. The second world war has demonstrated that geography is a basic science and must be made available to more citizens than in the past. At the same time, more and more geographers realize that biogeography is not only an integral part of their field, but is of fundamental significance. No doubt, future textbooks will devote more space to the elements of biogeography than is the case at present.

Cultural Uses

At the same time, it must not be forgotten that man, too, has intimate relations to his living environment. How deeply does the farmer feel his kinship with the plants and animals which he observes daily throughout the seasons. How eagerly does the city dweller try to carry with him from visits to the country those stirring experiences of autumn colors or an array of flowers on a mountain meadow, a flock of migrating birds of passage or the awakening of spring with its delicate colors of grass and trees and the heartening calls of song birds. Man's ability to observe the creatures about him is of greatest value in his endeavors to earn his daily bread, and above all, to form a philosophy of life which will sustain him in times of crisis. And it is the biosphere which most readily invites him to observe, which can be observed most easily, and which is perhaps one of the simplest and most effective means in shaping our ability to observe. But to man it is a great deal more than a mere tool.

Practical Applications

Rightly or wrongly, many people place a great deal of emphasis on the applicability of a science. They argue that if it cannot be applied it cannot be useful and it is merely a waste of time and energy to carry on investigations the nature of which is purely academic. While this rather widespread attitude is regrettable, it can at least be said that the study of biogeography is eminently practical and fertile. In peace and in war many people are engaged in activities which require an intimate familiarity with the landscape. As the vegetation is one of the most prominent of all natural features, its study becomes inevitably a matter of urgency.

The opening up of new lands for settlers and refugees from the glorious but sadly stricken continent of Europe is an important matter in many countries today, especially in various parts of Africa, Australia, South America, and Canada. Such settlements can only be useful if they are of some permanence. But no one can be expected to remain in a region unless it is equipped to receive and support the settlers. Such potentials as productivity of the soil for crops and pastures, such characteristics of the substratum as drainage or the extent to which it permits the development of communications are all basic features that must be known. But the time is short and information on the "new" areas is usually inadequate or altogether lacking. An intelligent biographical survey will at once supply the necessary data, at least in outline, and sufficient to prevent undue hardship. Such a survey can, more rapidly than any other method, reveal the potential wealth of a region in forest resources and wild-

life, in climate, soil, and water, and the possible adaptation of these to an organized establishment of new communities.

One of the most subtle and yet most valuable aspects of biogeography is its application in agriculture through the use of phenological data. The phenological maps that have been drawn, especially in Europe, have permitted a reorientation of intensive agriculture that was of immediate and substantial benefit to the farmers. In phenology, important performances are recorded to be used as a guide for seasonally conditioned agricultural activities. The appearance of migratory birds, the unfolding of leaves or blossoms, the turning of color of the foliage, and innumerable other phenomena are recorded according to species and date of occurrence. It has been shown that these phenomena can be related to climate and soil and that they represent much surperior guides in chosing the appropriate time for sowing and reaping, for combating insect pests, for increasing the yields per acre, and even for choosing better crops for a given region. For example, the very considerable damage done to the wheat crop by the Hessian fly in West Virginia has been greatly reduced and in some cases altogether abolished through the use of biogeographical data.

Military Applications

Perhaps the most dramatic illustration of the need for biogeographical knowledge was supplied by World War II. Many who are not familiar with the usefulness of biogeographical investigations may have wondered why the federal government, and more especially the branches responsible for the efficient conduct of the war, should become interested in drawing vegetation maps of sundry areas all over the world. But the vegetation does not only affect the security and well-being of individual soldiers but actually influences and to a certain degree determines the strategy of whole armies. The reader need only recall the vicious jungle fighting on Guadalcanal or the fierce struggle in the ill-fated Hurtgen forest near Aachen, where the intelligent exploitation of the vegetation permitted the defenders to engage unduly large numbers of American troops and resulted each time in a blood bath of a magnitude that would be incomprehensible if one were to ignore the distribution of vegetation.

On the other hand, the absence of trees or any form of vegetation usually results in a possibility to advance rapidly and over long distances. This is best illustrated by enormous seasonal advances and retreats of the German army over the Russian steppes and by the spectacular campaigns of Marshals Rommel and Montgomery on the barren littoral of Libya and Egypt. In both cases hundreds of miles were gained or lost, while the exchange of territory in the forests in the same span of time was counted in yards.

As an example of the influence animals had on the course of the war, one may cite the reef building corals. Their bulwarks around northeastern Australia and such islands as Truk and Ponape were extremely efficient, and to the knowledge of the writer no attempt was ever made to conquer these major defense bastions of the Empire of the Rising Sun, although Truk was bombed thoroughly from the air.

Conclusion

These examples could be multiplied ad libitum with instances from every continent and century throughout the long history of civilization. They indicate the value of a knowledge of the various aspects of the biosphere. The intelligent use of such knowledge is as certain to assist man in his various endeavors as it is sure that failure becomes highly probable wherever this knowledge is inadequate or lacking.

Life on earth is of a significance utterly different from any other aspect of the entire universe. So far, living organisms have been found to exist only on earth: one small planet in the immense realm of galaxies. And since man has developed the faculty to reason, his attitude towards life has controlled to a very considerable degree his conduct as an individual or in a group, his cultural achievement, and his possibilities of further evolution. His spiritual growth is intimately linked to his attitude towards all other manifestations of life, especially since it is quite impossible for him to live in isolaton. To advance the knowledge of life is therefore of value to man and while biogeography is only one branch of this much ramified knowledge, it is nevertheless making its important contributions which have already so much enriched man's understanding of life in general and of himself in particular.

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Conservation Education

By THOMAS FRANK BARTON
Indiana University,
Bloomington, Indiana

THE hope of conserving our natural resources rests with an informed public. From man must come the desire and the will to understand and work for this common cause. In a large measure much of the responsibility for the success or failure of the conservation program in our country rests with our public education system. Scientific research sponsored by universities and private and federal agencies has discovered and amply demonstrated wise conservation practices.

The Education Bottleneck

A bottleneck exists in our schools where there should be a dissemination of this information to our people. Our big problem is to teach young and old alike why conservation is necessary, what can be done to renew and protect our resources, and how to use them wisely. There are many who believe that good conservation teachers are needed more today than research workers because there still exists a wide gap between conservation research and conservation education.

The amount of conservation taught in American schools today is disappointingly small and the quality of instruction often inadequate. Within the last fifteen years conservation education has made some progress, but most of the pupils and students graduating from elementary, high schools, colleges, and universities today will lack training in the fundamentals of this vital subject. This condition exists in spite of the conservation movement started nearly fifty years ago by Theodore Roosevelt and his contemporaries.

Why does there exist such a large gap between public conservation interest and conservation education? This perplexing question cannot be completely answered in this short article. One can say, however, that some of the reasons for the slow growth of conservation in our curriculum are:

1. Many teachers, administrators, and laymen confuse conservation with preservation.
2. Teachers are often inadequately prepared and conservation courses, when available, are few in number.
3. Many people fail to see the need for and the opportunities of a high-school conservation course.
4. High grade classroom teaching materials are scarce and difficult to locate.
5. Community and regional conservation problems have been neglected.

Newer Philosophy of Conservation

The terms "preservation" and "conservation" of natural resources are still often confused. At the turn of the twentieth century, President Theodore Roosevelt popularized a policy of resource preservation by increasing the forest reservations to more than one hundred million acres.

In contrast with preservation, conservation is the wise use of a natural resource. J. R. Whitaker writes, "Conservation seeks to insure to society the

maximum benefit from the use of our natural resources."[1] Mature trees should be cut and used. If sustained yield methods are used, the mature trees are soon replaced by young ones utilizing the sunlight, water, and soil minerals which would have gone to the old trees. More people need to learn that it is possible to grow more lumber per acre under sustained yield methods of selective cutting than it is to set aside land and permit nature to take its course.

As for wildlife, a policy of regulated hunting could be adopted should it increase too rapidly for its habitat. To permit natural resources to go to waste is not good conservation practice.

Teacher Preparation

Are the classroom elementary and highschool teachers adequately prepared to teach basic conservation understandings? Is it safe to estimate that of the teachers receiving certificates qualifying them to teach in the elementary or high school, less than 10 percent of them have taken a college or university course in this subject? Although there are educators who oppose laws requiring teachers to pass a survey course of this kind, many will agree that colleges and universities should make such a course available. Yet in the United States today, many liberal arts colleges, universities, and teachers colleges do not offer a general survey course in conservation.[2]

In some colleges and universities various phases of the subject are taught in a number of different courses and these courses, in turn, may be offered by a number of different departments. But students preparing to be teachers or attempting to get a liberal arts education do not have time to enrol in several different courses in four or five different departments in order to glean a general knowledge of this vital subject. When a general or survey course in conservation has been made available in all colleges and universities, then truly conservation education will have passed an important milepost.

Without an adequate minimum knowledge of this subject three general things happen to the teachers. They get lost in the details of the subject and fail to give a well-rounded presentation of any topic or phase of the subject. They skim over the subject presenting only shallow learnings. Or, they may abandon teaching conservation understandings when some children seem to be better informed than the teachers themselves about some phases. The best teachers are those who feel secure in their knowledge of the subject.

In teacher training institutions, more can be done than merely offering a survey course in conservation. Here can be developed a conservation program to fit the needs of the region the college serves. In order to give a practical rather than a theoretical example, let me briefly describe a conservation program developed at the Southern Illinois University.[3] The program though still young represents growth

1 A. E. Parkins and J. R. Whitaker, *Our Natural Resources and Their Conservation* (John Wiley and Sons, 1939), Part IX.

2 Katherine Cook and Florence E. Reynolds, *Opportunities for the Preparation of Teachers in Conservation Education*, (Federal Security Agency, U.S. Office of Education, Pamphlet No. 90).

3 As head of the geography and geology department, the writer developed the program during the years 1935-47 encouraged by the late president, Roscoe Pulliam, and Dr. Hal Hall, formerly principal of the University High School. Minor changes may have been made in the program in recent months.

and development as needs and opportunities arose.

University Conservation Program

Southern Illinois University is located approximately fifty-five miles north of Cairo and about one hundred miles southeast of St. Louis, in Carbondale, Illinois. It serves thirty southern Illinois counties with an aggregate population of about one million people. The southern part of the state differs from the rest of Illinois in climate, landforms, soil, water resources, vegetation, minerals, and problems of conservation.

Southern Illinois originally was an area rich in forests, wildlife, minerals, and a good soil. Today its resources are sadly depleted. Approximately one-half of the land is now badly eroded and much of the farmland is marginal or submarginal in character. Here, besides soil erosion, other problems which are more acute than in the northern and central part are reforestation, woodlot management, creation of haylands and pasturelands, water conservation, and flood control.

The Southern Illinois University conservation program consists of five parts. The first emphasizes conservation in the introductory geography course. This course is required of all students in the College of Education, and is taken by most of the students in the other two colleges—Liberal Arts and Science, and Vocations and Professions.

The second phase in this program is a survey course, restoration and conservation of natural resources, open to juniors and seniors. The textbook used presents on a national scale problems such as forests and reforestation, soil erosion, wildlife conservation, flood control, and so forth. Classroom lectures and student reports are based on local conservation problems as they exist in southern Illinois and the state. Directors of local projects and governmental officials are invited as guest classroom lecturers. There is no prerequisite to this course, and credit for the course may be applied on a geography, economics, sociology, or social studies major or minor.[4]

The third phase of the program consists of a highschool course.[5] This was added to the University High School in 1939. Besides giving highschool pupils an opportunity to study an interesting and practical subject, this course enables some university students to do practice teaching in this subject and enables other university students to attend as educational observers.

Methods and problems in conservation, the fourth phase of the program, is taught in the Graduate School. This course is for teachers and administrators of conservation and allied subjects. The core of the course is materials and methods.

One week conservation workshops is the fifth phase of the program. In the summer of 1946, the one week conservation workshops were first offered in Illinois by state supported institutions of higher learning. The activities were co-ordinated by the office of the State Superintendent of Public Instruction.[6]

4 Thomas Frank Barton, "Geography in a Social Studies Field Major," *Journal of Geography*, XLVI (1947), 275-79.

5 Thomas F. Barton, "Teaching Conservation in the High School," *Illinois Teacher*, XXVIII, (1939), 71, 94, 95.
Thomas Frank Barton, "High School Conservation," *Journal of Geography*, XLVII (1948), 81-92.

6 H. O. Lathrop, "An Experiment in Conservation Education," *Journal of Geography*, XLVI (1947), 96-100.

Such a workshop was generally held at the county seat and attended by in-service teachers of that county. The objective was to acquaint teachers with conservation problems, projects, proper methods of resource utilization, and conservation personnel in the county in which they teach. It was an endeavor to stimulate and inform elementary teachers of conditions in the local area so they in turn would teach conservation along with other subjects.

Highschool Conservation

A number of reasons justify adding a conservation course to the highschool curriculum in southern Illinois. Among them are:

1. A large percent of highschool graduates never attend college. It is not enough to teach a child a few concepts or units in the elementary grades. When you add, however, what he learns there to a highschool course then real progress can be made.

2. The highschool student is more mature and ready to study more phases of the subject and in greater detail. At this level the teacher may present a complete picture of the entire field with its many ramifications. In the elementary grades wildlife and forests may be emphasized and other important phases such as land utilization, water resources, recreation, and so forth may be omitted.

3. Most of the "life problems" of southern Illinois are rooted in the use and misuse of the natural resources of the area. The problem method is one of the principal and most stimulating highschool methods of teaching. Most phases of conservation are easily taught in this way.

4. Although some of the high schools have good two, three, or four year agriculture courses, most of the students do not enrol in agriculture.

5. Conservation is an excellent correlating subject of the subdividing fields of social studies, physical science, and biology. It is almost an ideal subject as a capstan course to pull basic understanding of these fields together.

Teaching Materials

The competent elementary and high-school teacher is handicapped by the dearth of high-grade authorative classroom materials. This condition exists for several reasons. Some of these reasons are:

1. Since conservation does not occupy a definite place in the elementary curriculum, textbook companies have not prepared series of books for the various levels.

2. Many commercial concerns feel that teacher material needs have not crystallized to the point where production would be profitable.

3. Few conservation readers are available.

4. Such a large quantity of materials have been labelled conservation in an attempt to popularize them that it is difficult for the teacher to locate the good authorative materials.

5. Classroom teachers with ability have not had time to prepare their own teaching units or at least have not made these units available for wide use.

These handicaps are not insurmountable. Educators interested in conservation need to formulate check lists of basic concepts and understandings that could be presented to elementary children. With these objectives in mind, it is possible to think more definitely about material needs.

Teachers need authorative guides to existing materials of high grade. They need manuals of selected and annotated conservation slides, film strips, films, and other visual aids. These might be made by an evaluating committee or group, composed of members who are authorities on conservation and engaged in teaching at various levels of education.

Manuals on selected and objective annotated bibliographies of government publications in the various branches, such as Soil Conservation Service, Forest Service, Fish and Wildlife Service, and numerous others, are also needed as well as selected annotated bibliographies of governmental and private (1) conservation maps, (2) pictures, (3) other visual aids, (4) recordings, and (5) conservation readers.

The preparation of teaching units is not easily solved. Elementary and highschool teachers are busy people. They do not have time to carry on research, digest all government bulletins, read all the conservation magazines, examine and preview visual aids materials, and then write their own teaching units. The precollege teacher is, more than some realize, a middleman. She takes available material and attempts to present it to the younger generation. Give the experienced teacher something practical and she will use it. The material should, however, be clear, concise, worthwhile, authorative, and written for the right level.

Although good teaching units are available from governmental sources, many of the units produced by government agencies are difficult to use in classroom teaching situations. Some of these units stress facts rather than understandings. They fail to show adequately the relationship between the specific detail and the broad understandings.

Community and Regional Problems

Too often national conservation problems, practices, and projects are taught in the classroom with little, if any, attention given to the local situations. Highschool and university texts written for national use cannot develop problems peculiar to the local community or region. Because of textbook limitations the responsibility for teaching local problems falls upon the teacher. Many of them, however, do not assume this responsibility of preparing information and units on local problems. They are not aware that such a responsibility exists. They have been taught conservation facts and understandings in college on a national scale and have not been made aware of methods of studying local projects.

A variety of methods are now used in some university courses to acquaint prospective teachers with local conservation projects. Instructors prepare lectures on regional and state phases of conservation. Directors or project personnel are invited as guest lecturers. Field trips are taken to conservation areas. For example, "the conservation classes [at the University of Wisconsin] visit the Federal Forest Products Laboratory in the campus, local fish hatcheries, the State Game Farm at Poinette, the Menominee Indian Reservation, the Soil Conservation Station at LaCrosse, the Eagle River Camp of Trees for Tomorrow, Inc., and the State Conservation Department headquarters at the capital."[7]

Some colleges give a course on a

survey of state natural resources.[8] One week conservation workshops held in county centers, use the afternoons for field trips within the county. And in some courses students are taught methods of collecting and organizing information about local problems, projects, and practices.

Steps in Presentation

There are at least six important steps in presenting a conservation problem. These are: (1) give adequate description of resource depletion, (2) provide historical perspective by comparing the present condition of the resource with the original and giving a concise explanation of how depletion took place, (3) present remedial practices which should be adopted, (4) cite places where similar practices have proven successful, and (5) visit demonstrational area where the problem is being solved, and (6) if possible, engage in some conservation activity.

In many places often too much emphasis is placed on how our rich virgin resources were wasted and depleted and little on its restoration. The writer never condones waste but believes that the energies spent on lamenting past actions often would be more useful if applied to correcting a bad situation.

We need now to introduce and stress the "doing" stage. How have the people in the next county or state solved a problem similar to our own? Do we have similar problems to those which existed in the Tennessee Valley Authority project and, if so, should we develop a watershed project? How did a certain farmer solve his soil erosion or woodlot problems?

The "doing" stage appeals to youth. For example, the boys of the Anna-Jonesboro-Community high school in Illinois who planted approximately 100,000 seedlings in abandoned, worn-out fields and in existing timber areas to improve stands in the Shawnee National Forest learned practical conservation measures and methods under competent supervision.[9] But perhaps more important they now have an investment in their community, state, and nation's future. Youth and adults alike react favorably to challenging situations, especially if they know solutions exist.

7 Quotation from letter written by Prof. Arch C. Gerlach, department of geography, University of Wisconsin, to the writer.

8 Central State Teachers College, Stevens Point, Wisconsin, which provides courses for conservation education majors and offers this type of course.

9 "Anna-Jonesboro Students Plant 100,000 Trees," Southern Illinoian Section, *Carbondale Free Press*, April 2, 1948. [Albert Nicholas is superintendent of the high school.]

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Geography *for the* Secondary Schools

By VILLA B. SMITH
John Hay High School,
Cleveland, Ohio

DOES the highschool student need geography? Are there many occasions when he should know its facts? Does geography help him orient the history and social problems of his country with those of the world? Does geography provide an understanding basis for the problems of conservation, the utilization of natural resources, the appreciation of the dominant interests of various regions, and the more complex world problems of today?

The answers to these questions reveal that geography does provide the background for a consideration of present national and international problems. Many of our present and past errors are due to an ignorance of common geographical facts. Our prosperity and continued high standard of living depend upon the soil, the minerals, the forests, and the energy of our people. Where but in geography could a pupil obtain the facts which are basic and vital to our economy?

The highschool student is aware of the smallness of the present world. The airplane and the radio make that fact a commonplace. He is aware of national and international problems. The highschool history and social studies place emphasis there. But why is the fundamental knowledge embraced in geography and necessary for clear understanding neglected?

Any attempt to view national and international problems without an understanding of geography is futile. It is being attempted, however. Until geography is known and understood and used, students cannot get to the root of present day problems.

Missing Where Most Needed

Why has so vital a subject as geography almost disappeared from the highschool curriculum, and why is there an almost universal lack of understanding as to what geography is and what it has to contribute to pupil attitudes?

Highschool geography labors under several handicaps. One is an educational "hangover" from the days when geography was the "sailor" type, mnemonic stuff, elementary and uninteresting. Another is the present day crowded curriculum. There is little room for modern geography in schools where the social studies program is already filled to overflowing.

The majority of the social studies curricula contain a minimum of geography, and that, all too frequently, taught indifferently, by someone unprepared in geography. The social studies curriculum with its multivaried content does not provide the pupil with all of the basic skills for interpreting the current problems of our land and the modern world.

It is quite difficult for an executive who is responsible for a school curriculum and who has been trained in a special history field, to appreciate how the deficiencies of pupils in simple geographical ideas influence their acts

as citizens. Often when school executives realize fully this deficiency, they do nothing about it.

A Living Subject

Geography is a living subject, never static, ever changing. It is not something to be memorized. It is not something within the covers of a book, or within the walls of a schoolroom. It is not a subject limited to elementary instruction, and unsuited to the secondary field. It is a part of daily living. An understanding of its principles is essential for well-informed citizens everywhere, whether concerned with local, state, national, or international problems.

Fortunate indeed, are those who have been privileged to pursue well integrated courses from elementary school through high school. To them "one world" has real meaning and significance. To them an understanding of the interdependence of nations is based on an appreciation and understanding of world commercial and political patterns.

For the most part, however, geography remains an elementary school subject. The majority of our citizens have little contact with it beyond the sixth grade. From sources outside the schools there are many signs of dissatisfaction with this situation, and realization of our serious handicaps. The oft quoted comment of John W. Studebaker, former U.S. Commissioner of Education, concerning our "geographic illiteracy" is only one such sign.

Two world wars have afforded opportunity for people to check their geographic knowledge and to evaluate their skills in using geographic data. Two world wars have focused attention upon geography and have brought forcibly home to the average citizen his woeful lack and his urgent needs. War experiences have demonstrated how utterly geography instruction has failed to reach the general public, and have demonstrated how absolutely essential such instruction is.

To the layman geography is place geography. The war brought out maps and atlases, and acquainted people with distant lands and seas. There was an upsurge of interest in location, in distance, in direction. Many, for the first time, became aware of our earth as a globe, and of flying routes over polar regions and of great circles. The trying war years were years of discovery for the folks at home.

For the boys in the armed forces, the war years were, likewise, years of discovery, of first hand contacts with distant lands and people, and with relentless forces of nature. Short, intensive courses in geography often were part of their conditioning and preliminary training. Without such courses they would have been totally unprepared to meet or understand the problems of a worldwide battlefront.

War mustered the forces of geography. Trained geographers were mobilized and their knowledge and skills put to fullest use in all fields of endeavor. Geography was indispensable. Geography was of incalculable value. Why should so serviceable a subject be neglected in times of peace?

Geography and World Understanding

Every highschool pupil should be trained in modern geography. He is a citizen of the world and should be at home in any region and conversant with its conditions. There are certain fundamentals that he should master. If he has had well-integrated elementary and junior highschool geography,

he has a foundation upon which to build. But all too frequently he must take time to acquire elementary skills.

He should know the names and locations of the states of his own country. Such mastery is not an end in itself. But for intelligent use of maps, the comprehension of reading materials, and general understanding, such mastery is a necessity. The names and locations of the nations of Europe, and of other continents, is likewise essential. No one can be at home in the world and fully comprehend world problems without this knowledge of location.

A recent Gallup poll showed that about one-half of our adult citizens when taken at random, could identify Ohio on a map, and only one in five could spot Texas or California correctly. A check of Europe revealed that in spite of discussion and millions sent Greece, only a third of the adults interviewed could check Greece on a map. Only one in four could locate Czechoslovakia. As for France, the great battle ground of American youth, only half of the adults could locate it. This is a serious defect of our schools.

Place geography is only part of the picture, however. What would be found if polls could check less tangible items? One can well imagine the confusion and bewilderment if people at random were asked to furnish geographical facts or to use such facts in explaining some current world problem.

Geography and the Social Studies

That geography has not lived up to its possibilities or attained its goals is apparent. This, however, is not due to an inherent weakness in geography, but to a situation that makes it impossible for geography to make its full contribution.

Geography can serve the field of the social studies. It has much to offer, and should be given an opportunity to make its distinctive contributions. Its fundamentals cannot be presented incidentally. It should be elevated from its subordinate role and given a chance. It is the weakest link in the highschool social studies program. It is the most needed and the most neglected.

Special Contributions

Geography is concerned with the earth, and with man and his adjustments to his earth environment. It is concerned with the activities of people within political areas, and with their interdependence. It is concerned with the interdependence of nations. An understanding of geography is basic to an understanding of world political and economic problems.

Many of the facts with which geography deals are obtained from maps. Maps are essential tools. The highschool student should have experience in using such tools, and through their use should acquire skill in securing significant data. Topographic maps, physical maps, rainfall maps, soil maps, resource maps, weather maps, population maps have unlimited information for students trained in their use. Maps have far more to offer than the facts of location. They are the sources of a great variety of information for interpreting and understanding human activities.

Geography presents facts, which are used in thinking geographically. There are facts concerning the natural environment and facts concerning human activities. Geography is not concerned with either of these alone, but with the ways in which man's actions and thoughts are related to the place in which he lives. Man is adjusting

his ways to a local, a national, and an international environment. It is with these adjustments that geography deals. They are not something to be memorized, but something to be sought out, explained, and understood.

The present industrial world cannot be understood without facts relating to sources of power and raw materials, transportation facilities, labor supply, markets, and the like. The industrial regions of northeastern United States and western Europe have worldwide ramifications. They reach out into distant lands for raw materials and seek world markets for manufactured goods. They are concerned with world trade routes and the control of strategic points along these routes. Their problems are economic, political, and international. Their solution requires basic geographic facts.

Geographic thinking is essential for an understanding of many current problems. The problems of a world food supply are deeply rooted in geography. They are a population problem, a land-use problem, and basically a problem of limited arable land. Must not all these problems be considered in our efforts to alleviate human suffering? Can they be solved by shipping food to starving millions?

In our land of plenty are there needs for better adjustments to the land and the soil? An understanding of conservation and its application to environmental conditions is essential if our dust bowls are to be eliminated and wind and water erosion checked. An understanding of the soil, and ways to maintain its fertility; an understanding of crops and their adjustments to soil and climate are essential to our food supply.

Had rainfall cycles been understood, many problems confronting farmers on reclaimed lands of Florida could have been avoided; likewise, many problems of the Great Plains where years of rain bring abundant harvest, and years of drought bring want. Such extremes are inevitable and call for a wiser use of geographic facts.

The problems of an Air Age call for a still wider knowledge of geography. Today interior cities of the United States are ports of entry. Connected by airlines with the far corners of the earth, they are no longer remote or isolated. They are as near northern Europe as are Boston and New York. Their nearest neighbor, barring Canada and Mexico, is Russia. Can we afford to ignore such facts? Can we afford to be uninformed concerning the strategic importance of Alaska as a gateway to Asia?

Today, as never before, the citizens of the United States must meet national and international problems. They should be well informed. Where but in the high schools can the greatest numbers of our youth be reached and trained for intelligent citizenship? It is high time that we consider the role of geography in their training.

A Final Question

Geography is the basic social study from which others stem. It is the foundation upon which they rest. Our national problems require considerations that cannot neglect basic geography. Local problems of industry, transportation, and agriculture require geographic facts in their solution. Geography makes special contributions essential to an enlightened world understanding. With our ever increasing responsibilities for wise decisions, *is it not time that our high schools find a place for worthwhile courses in modern geography?*

Geography *in the* Junior High School

By JOSEPH A. JANNI AND JOHN ARTHUR BROWN
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MANY future teachers have become so interested in geography after taking the subject in the public schools that they have later majored in geography in colleges. Others who never went to college have found that geography contributes to their enjoyment and understanding of public affairs and life in general. The rapidity with which geography has progressed and the improved position the subject enjoys in our curriculum are noteworthy. It is not likely that it will lose this position since the understanding of present and future global events make it imperative that students have a geographic background and world mindedness.

An Early Beginning

This understanding must begin early in the child's thinking and continue on into his formal education from the primary grades. Of course, the concept is not so strongly developed in the lower elementary grades as it is later on in his schooling. At this earlier level, the child, under the teacher's guidance, centers his activity around his past experiences and observation, or around those concerned with the home, local community, and environment.

In the junior high school widening horizons in geographic thinking are found as the understanding of the basic knowledge of the ways of living in various parts of the world is increased. The child begins to project his thinking toward geographical facts and principles in their world-wide application in a complex and interdependent world. In geography he begins to understand economic and political forces which hitherto have been presented but were not strongly stressed. A greater realization of life activities and distribution of man, according to the conditions of his environment, is developed. It should be pointed out that this broadened viewpoint is not accomplished at the expense of local geography which the child studies as long as he continues his schooling. Through this viewpoint he is enabled to comprehend the deeper aspects of geography. His understanding of these wider vistas can be quickened by the application of a body of well-recognized principles. These general principles or aims are also applicable to geography in the elementary school. In the junior high school these principles are fitted to the deeper study of pupils at this level.

Over a period of years a list of general aims has been worked out by the writers in the teaching of geography in the junior high school and are presented to the pupils, for their consideration and guidance as they pursue their study. These general aims of geography are:

1. To find out what nature's gifts to the world are,

2. To see what use man makes of nature's gifts,

3. To learn that every effect has a cause,

4. To organize one's thinking and work,

5. To understand the relationship between man's activities and natural environment,

6. To increase one's knowledge of where to find geographical information,

7. To have a knowledge of place location, climate, physical features, and ability to read maps,

8. To increase one's knowledge of the nations of the earth and their problems,

9. To develop sympathy, respect, and tolerance toward other peoples,

10. To take a more active interest in conservation of resources and needed public improvement,

11. To develop pleasure in travel, reading, and understanding of nature.

The above list represents a diversity in aims ranging from those dealing with pure subject content to those dealing with more abstract ideas, such as attitudes, and finally, to those aims dealing with skills and techniques. To be effective these three types must go hand in hand and each should augment the others.

Until recently geography, as taught in the junior high school, was chiefly that of place location and description according to a standardized outline. This outline was made up of such topics as: surface features, climate, vegetation, minerals, location, commerce, drainage, and manufacturing. However, newer methods of geography teaching include the regional method, the project plan, unit plan, the problem plan, various forms of the contract plan, imaginary journey, topical method, deductive lesson, inductive lesson, the type study, and the appreciation lesson, to mention only a few.

The Unit Plan

There has been so much written about the above methods by their exponents that space will not permit a discussion of each. However, an explanation of one of the more important types of geographic presentation, the unit plan, associated with Dr. H. C. Morrison of the University of Chicago, is well developed in Dr. Morrison's book, *The Practice of Teaching in the Secondary School.* It gives some idea of methods and techniques used in modern geography instruction. In this type of presentation the mastery formula is: "pretest, teach, test the results, adapt procedure, then teach and test again to the point of actual learning." The outline for the development of the unit as used in our teaching follows:

1. *Exploration.*—The pretest stage is the one in which the teacher ascertains what background the students may have for this particular new unit of work. The background which these children have when they enter junior high school varies, because of such factors as: (a) the type of work done on the elementary levels, (b) the varying abilities and experiences of the pupils, and (c) the condition of local environment or local community studies.

The teacher, in ascertaining what background each student has in preparation for studying the unit, may use the written test, the oral quiz, or a class discussion. The exploration step also brings out the appreciation background of the pupil in the subject and prepares him for the new material to be presented. It not only points out the immediate needs and interest of

the pupils, but it also improves the pupil-teacher relationship by uniting the two in the search for knowledge.

2. *Presentation.*—Here the essentials of the unit are given by the teacher in order to arouse the interest of the class. Immediately after the presentation by the teacher a test is given and if the results of this test show that the pupils have not assimilated the presentation, another presentation is given to cover the unit again. The pupil must show comprehension of the work before proceeding to the next step, because the five steps of the plan imply that each step is necessary and should be in proper order for effectiveness. In some cases the exploration and presentation of the unit may be closely related or actually combined if the background of the class is about the same in experience even though all pupils do not have exactly the same information on each unit.

In this step audio-visual aids, such as motion pictures, film strips, slides, records, radio, field trips, exhibits, and graphs, if properly used, facilitate learning by building up interest in the unit being studied.

The remarkable success attained through the use of visual aids in the armed services has stimulated their use in our schools. The dissemination of knowledge in this manner is limitless in scope.

3. *Assimilation.*—If the test given in the presentation stage shows satisfactory assimilation of the material, several days or even weeks are now given to the study and understanding of the unit. We find the pupils in the classroom reading every type of material pertaining to the unit, writing, studying, talking with each other, individually or in groups, and consulting the teacher.

The assimilation step is a supervised, yet socialized, study period as well as a laboratory procedure. Individual differences are provided for at this time, by permitting those that complete their unit first to engage in other activities using the study guide, which is supplied each pupil. The guide furnishes him with an outline of the subject matter. It also provides for both fast and slow students since it parallels the activities to suit the varying abilities of the pupil and is followed by activities of his own interests, rather than those from the outside.

4. *Organization.*—When the teacher feels that the class has acquired a mastery of the unit, the class is brought together again and each pupil is required to organize his knowledge in a logical outline form, setting forth his facts and ideas.

5. *Recitation.*—This recitation is not the old fashioned rote method, but rather it is a period of socialized discussion in which group or individual presentation may be given. On other occasions all or part of the period may be devoted to lectures by persons invited by the teacher to visit the class. In some cases the period is utilized by individual study in the library, a debate, field trip, or more reports by the pupils.

Throughout the recitation activity, teachers have an opportunity, as they have had during previous steps of the plan, to offer guidance to their pupils. In this particular step teachers watch the students in their recitation, noting special weaknesses, then lending encouragement and assistance, give aid in overcoming these weaknesses.

In the operation of these, or any other plans, students are taught the effective use of textbooks, maps, tables, charts, and concrete materials as well as visual and audio aids. The fundamental aid in this list is, of course, the textbook. Although it is a foundation for the pupil's knowledge it is not to be the sole source of information. It is valuable for its concise statements of facts and principles of geography, its maps and pictures, statistics and suggested exercises, questions and problems. Texts written for use over the whole country are supplemented for particular regions. Lessons in geography today are not solely so many pages to read and recite upon, but rather topics, type of studies, or problems in which the text is but one important source of information.

Adequate Maps

The successful teaching of geography in the junior high school is particularly dependent upon adequate maps. Mastery in the use of maps should be achieved by students at this level. Wise teachers acquaint their pupils with the various projections and make the pupils aware of the projections' strong and weak points. If this is done, pupils will not fall into the classical error, as so many of their parents have, of believing Greenland to be larger than South America, because of the way it appears on the Mercator projection.

Map projections showing the great circle routes of the earth are gaining in importance as pupils study our Air Age world. The globe, of course, is a necessity for a truer representation of spatial differences, and the actual relationship of physical features to each other. Maps showing what nature has put on earth and what man has done with nature are important.

Very important in modern map study is the presentation of the human factors, the study of which goes hand in hand with the study of the natural factors. The ability to correlate these two factors is a vital part of geography and can be facilitated by the use of maps. For example: students in a junior highschool geography class studying a topic such as the Marshall Plan are aided in their understanding of the needs of the various European peoples and governments by a study of maps showing resources, land forms, etc.

The aforementioned are the more tangible tools in the teaching of geography in the junior high school. All this requires trained geography teachers to present the material to the students. The modern geography teacher is a trained specialist and has a wide understanding of the various social sciences. Today we consider geography in its relation to other studies. This trend in correlation has been followed in the schools of this country for some time. Undoubtedly it has been given recent impetus by our appreciation of the effectiveness of the German geopolitical system under which geography, politics, society, and economy were considered as inseparable elements in a driving force.

Subject Correlation

In our schools the extent and nature of correlation is varied. In some schools geography is combined with other social studies such as civics, history, and economics. In other schools subjects outside the sphere of social science are correlated with geography. This system has possibilities, but there is the possibility that geography, which is a study in its own right, might be obliterated in a combination

of subjects. This would be unfortunate and could possibly be as bad as the lack of geography teaching of the past.

Regardless of whatever types of programs are worked out in the future, the teaching of geography must advance. Progress in geography teaching recently has been favorable. In the future it will be even greater. In the light of our present world commitments in one world, findings such as those of the Gallup polls show a tremendous lack of geographic understanding. This is tragic. The failure in so many educational systems to provide for geography teaching on the secondary level is unfortunate. This situation places geography teaching in junior high school in an even more important position, since in many cases it is the last formal study of the subject many people obtain in a lifetime. If this situation were remedied geography on the junior highschool level would not lose its importance. It would still be the important link between the elementary and the necessary secondary presentation. In other words, it would be fulfilling the role it is presumed to be filling today.

Many other remedies are needed. Perhaps one of the greatest needs is the skilled specialists. These will be the teachers who, besides having knowledge of the subject will have the qualities necessary to facilitate the understanding of the more intangible elements of geography, such as tolerance, high ideals, love of learning, and an appreciation of the heritage, rights, and duties of citizens in a democratic society. All of these bring to us the realization that in the modern world no nation can live by itself.

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The Little Red Schoolhouse Comes *to* Saipan

By JOHN L. TAYLOR
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PROBABLY the most difficult, yet fascinating task ever assigned the writer was one wherein he was directed to develop an educational program for some forty-two hundred youngsters on Saipan during June 1944, when the island was wrestled from the Japanese and occupied by American forces.

Location and Importance

Saipan is a small, rugged, volcanic island 5,500 miles southwest of San Francisco and 1,250 miles south of Tokyo. It has an area of 46 square miles. Important to the Japanese for the production of sugar cane and other agricultural products, the Americans desired it as a base for regaining possession of Guam, 125 miles south, and later, in the advance against Japan.

During and following the occupation of Saipan by combined navy, marine, and army forces, over nineteen thousand native Chamorros, Carolinians, Japanese, Okinawans, and Koreans were rounded up and held in protective custody by the Military Government Unit at Camp Susupe and in the Chamorro-Carolinian village of Chalan Kanoa near the southwest corner of the island. These civilians were practically destitute. Their farms, homes, and personal possessions had been destroyed; and many of them were in a malnourished and emaciated physical condition when brought to Camp Susupe.

As soon as possible the men were put to work on civilian projects such as building Camp Susupe, cleaning up the island, planting crops, and assisting in maintaining law and order. Because it was felt that a combined education-recreation program would keep the youngsters out of mischief, and because it was in keeping with American ideas of free education, a school program was ordered. It was far easier to issue the directive than it was to put it into effect. Excerpts from a naval directive regarding the promulgation and adoption of a civilian education program are as follows:[1]

I. General

(a) The establishment of grades, and arrangement of courses of instruction will be on an eight year basis.

(b) The school week will be six days. The school year will be nine months.

(c) School attendance will be voluntary. Children will be admitted between the ages of 6 and 16. Absence without excuse will be sufficient cause to drop students to prevent laggards holding up class progress.

(d) Classes will be organized by racial groups, except natives may be included in the same groups.

(e) Vocational training will be made available as soon as possible.

(f) Extra-curricular activities along American lines, such as swimming, games, etc. will be provided. Boy and Girl Scout organizations will be encouraged.

II. Language

(a) *Medium of instruction*: The English language will be the sole language of

1 United States Pacific Fleet Forward Area, Central Pacific, *Letter to Island Commanders, Saipan and Tinian*, February 25, 1945.

instruction, as soon as practicable. Meanwhile, other languages, with which the respective racial groups are acquainted, may be used.

(b) *Subjects of instruction*:

(1) Emphasis will be laid upon conversational English.

(2) The Japanese language will not be a subject of instruction.

(3) The Korean language may be taught, as an additional subject.

(4) English classes will be organized for adults. Such classes will be scheduled at such times so as not to interfere with the regular school program.

III. Teachers

(a) Civilian teachers of the area who are considered trustworthy, after careful and thorough screening, may be used to teach children of their own racial groups.

(b) Civilian inhabitants of any racial group may be trained and used as instructors, subject to the limitations of (a) above.

IV. Curriculum

The several Education Officers of the islands in the Forward Area will meet to discuss and agree upon a uniform school curriculum which will, upon approval from this office, be issued as a Military Government Order.

A breakdown of the school population indicated there were roughly 3,300 Okinawan and Japanese, 450 Chamorro, 250 Carolinian, and 200 Korean youngsters of school age—six to sixteen. It was decided to combine the Chamorro and Carolinian children into one school, and in response to the naval directive, to provide individual school facilities for the Koreans since they felt bitter towards their former overlords. Grading was practically impossible except in the Japanese school because neither the Chamorro nor Korean language had been taught previously, and none of the children knew English. For example, a child might be in the sixth grade in mathematics—the Japanese had done excellent work in this subject—but all were in the first grade in English.

The Language Problem

Perhaps the chief problem was that of language differences. The writer's knowledge of the Japanese language was limited and inadequate for the purpose at hand. Moreover, interpreters were at a premium. The Japanese teachers were, as a rule, cooperative, but those who had been trained were few in number. Most of the schools had been staffed by poorly prepared Okinawans whose ideas of good pedagogy were at variance with ours. Only one Korean had had teaching experience and none of the Chamorros or Carolinians had been trained beyond assisting with monitorial duties in the parochial schools.

Volunteered Services

Fortunately, five Spanish nuns who had withstood the invasion volunteered their services. Needless to say, they were accepted since they spoke both Chamorro and Japanese and a little English. The Okinawans and Japanese spoke neither Chamorro nor Korean, although a number of the Koreans were haltingly conversant in Japanese. Most of the Carolinians understood neither Chamorro, Korean, Japanese, nor English. It was not the wish of the Americans to impose the Japanese language on the Okinawan non-Japanese and other people.

It was, therefore, necessary for the educational officer to go over the lesson of the day with the several Nisei[2] interpreters who would in turn, in Japanese, discuss the day's assignment with teachers from the three schools. The interpreters would drill them for an hour each morning before the teachers would go to their respective schools to conduct their English classes. Special emphasis was given to conversational and basic English. However, by midafternoon an English phrase that had been passed from offi-

2 Second generation Japanese service personnel.

cer to Nisei to teacher to student became barely recognizable.

Japanese as a language was not a subject of instruction but it could be used by the teachers in conveying instructions to the students. The Korean language was to be offered as an optional subject. There is no standard Carolinian language because each major island group in the Caroline Islands has its own dialect. Because the Carolinian youngsters had not previously attended school, they knew no tongue other than their own, and none of the Chamorro teachers knew the Carolinian dialects. Thus, the Carolinian children were at a distinct handicap. Moreover, there were no Carolinians who qualified as teachers.

By July, 1945, fifty-six Japanese, eleven Chamorro, five Korean, three Catholic sisters, three Nisei, and three naval personnel were employed as an instructional staff.

Equipment

School equipment was entirely nonexistent. Outdoor classes with students seated on the ground were unsatisfactory because of the rain and the dampness. School buildings did not receive a high constructional priority. Tents and tarpaulins were used but they were poorly ventilated. Carpenters and handymen, lumber and nails were highly sought after by public works and were not available for the construction of desks, tables, and chairs.

Paper, pencils, chalk, blackboards were critically scarce materials. Textbooks, maps, globes, and charts could not be obtained. School garden plantings were hampered by the lack of seeds, but those plants which could be propagated by slips and cuttings were very popular. Swimming proved to be a very pleasant form of recreation, because an excellent sandy beach was located some 400 yards from Camp Susupe. Most of the youngsters enjoyed volleyball, baseball, and ping-pong; but equipment for such games was difficult to procure.

Subject Matter—Curriculum

In accordance with paragraph II of the previously quoted directive, the education officers prepared a teaching program which embraced English, arithmetic, natural science, geography, civics, vocational training, domestic arts, music, organized recreation, and gardening. Each child was to be under school supervision from twenty-two to thirty-six 40-minute periods per week, depending on the grade level. As special training in English was demanded, this subject was taught from nine to twelve periods per week. For example, an eighth-grade student would participate each week in six classes of conversational English, three classes of reading, two classes of writing and composition, and one class of spelling.

Arrangements were made to use school facilities during the noon hours and evenings for classes in English for adults. Teachers, policemen, camp officials, nurses, labor foremen, and office workers attended classes in English taught by American service personnel.

After a few months, sufficient buildings had been constructed to enable half the students to attend classes in the morning and half in the afternoon.

Providing textbooks for 4,200 students was utterly impossible. Frantic appeals to Hawaii brought some relief, but the small number and the large variety of books sent, prevented their extensive use. Moreover, the materials

in these texts were entirely inappropriate for youngsters in this island environment. Accordingly, Japanese-English, Chamorro-English, and Korean-English primers, vocabularies, and dictionaries were composed, compiled, and mimeographed for distribution by the teaching staff working under the supervision of the education officers. The Office of War Information assisted in providing flash cards, globes, maps, pictorial materials, visual aids, and sound equipment.

The Education Office prepared courses of study in geography, history, agriculture, health and sanitation, and civics, based on actual Saipan conditions. The pamphlets were prepared in English and then translated into Japanese in order to enable the teachers to comprehend them. They were too difficult for children below the sixth grade. American personnel experienced in textbook and course-of-study preparation were not available in numbers large enough to adapt them to the primary level. Like most American teachers, the Japanese had had little experience in curriculum preparation. Several of the well-trained Japanese who formerly were teachers, supervisors, and principals could not be cleared by naval screening authorities.

Even singing, calisthenics, and marching were under careful scrutiny by a perhaps overzealous intelligence tary Government Unit.

Although all civilians lived within the confines of Camp Susupe and Chalan Kanoa, some 300 families spent the day on a 300-acre co-operative farm under the supervision of Military Government police. As a consequence, several schools had to be established in the farming communities in order to serve the farm youngsquad which was assigned by the Militsters. Such schools were particularly difficult to supervise, but they served the very useful purpose of occupying the time of about 500 pupils.

Gratifying Progress

Notwithstanding the numerous difficulties encountered, a gratifying amount of progress was made in the educational program. Students and teachers alike were co-operative and interested; but the Japanese and Okinawans—realizing that they would soon be repatriated or evacuated despite the fact that many of them had never been to Japan and had no ties in the homeland—could see no reason for their learning the English language. Knowing they had the right of petition, several of the leading Japanese teachers presented the following request for the consideration of the Military Government after the institution of the new curriculum.

27 April 1945

1. We are citizens of Japan and wish to return to Japan after the war. Returning to Japan makes it necessary to learn and understand the language. Therefore, we wish to teach the Japanese language.
2. The parents do not want the English language and might not send their children to school.
3. We do not think this program can be carried out due to lack of classrooms and teachers.
4. We would like to carry on our program as we have done up to this time.
5. To work on mathematics problems or any other problems will be impossible unless we understand the Japanese language. Therefore, we beg you to let us teach the children the Japanese language.

Realizing that the administrative authorities would probably refuse to accept the petition, the Japanese teachers presented the following proposal for de-emphasizing the study of English in favor of Japanese.

27 April 1945

If learning the English language is compulsory:

1. We recommend the present plan of teaching English as follows:

Age	Grade	Hrs. of Eng. Per Week
7	1	0
8	2	0
9	3	0
10	4	0
11	5	2
12	6	3
13	7	3
14	8	3

2. The number of hours in the present plan to teach English to the children in one week is too much. The children, having only two meals per day may not have the interest to study that long.

The petition was not granted but consideration was given to several portions of the request.

Following the Japanese surrender, school facilities were enlarged, and more and better teachers were employed. Supplies became available and the Japanese population, knowing their repatriation was imminent, sent their children to school with apparent satisfaction.

Evacuation of Koreans, Okinawans, and Japanese began during December and was completed by February, 1946.

Today, Saipan has a large 14-room school in Chalan Kanoa for its 932 pupils. Busses are used to transport children from the three outlying villages. A school staff consisting of twenty classroom teachers, three shop teachers, two agriculture teachers, a sewing teacher, a librarian, a secretary, and a janitor, is employed. The teacher's salary scale ranges from $32.50 to $55 per month with an average of $41. Eleven apprentice teachers are being paid at the rate of $5.00 per month during their training period. All school expenses are met by the municipal budget and not by the Civil Administration[3] appropriations.

The teachers are native Chamorros or Carolinians who teach on a half-time schedule and attend teacher training class half-time. The staff is headed by a Guamanian superintendent. Classes for adults, offering English and business subjects, meet three times a week and are taught by volunteer American teachers. A very lively Parent-Teachers Association with 530 members has been active since 1945.

Future

Education in Saipan faces a bright future so long as American military forces remain on the island. There is ready employment for young people who can speak, read, and write English as telephone operators, messengers, clerks, chauffeurs, mechanics, carpenters, hospital workers, domestic servants, and workers in the various supply and public works yards. The Chamorro and Carolinian youngsters are anxious to obtain an education now because they realize it will increase their earning power; but if and when the Americans leave Saipan, the educational opportunities will very probably decline.

3 The term "Military Government" was changed to "Civil Administration" in September, 1947.

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Contributions *of* Geography *to* American Democracy

By OTIS W. FREEMAN

Specialist for Geography in Higher Education, Office of Education, Washington, D. C.

THE teaching of democratic principles in our schools from the elementary to the college level can be assisted by contributions from various subject areas, one of which is geography.

In the colleges of education and other institutions of higher learning engaged in training teachers, several courses in geography include topics which have particular value for the learning of proper concepts about our country and the development and maintenance of democratic standards. Among the geography subjects that are useful along these lines are generalized beginning college courses in elements of geography, human geography, and economic geography, and also several regional and systematic courses in geography which can make important contributions to understanding of the American way of life and the interrelationship between the United States and foreign lands. Especially noteworthy in connection with our homeland are courses in North America, historical geography of the United States, and conservation. For international relations, political geography and regional courses on the Pacific area, Latin America, and the continents of Europe and Asia are of particular value.

General Geography.—Many principles and ideas of use to students, and later to them as citizens of the United States, can be taught in connection with the first college course in geography. The concept that for permanent success people must be in proper adjustment to their environment should always be emphasized. It is valuable to know the causes for weather and about the differences in climates, because man's activities and many of his actions and opinions stem from climatic factors. Landforms influence transportation, land utilization, military use, expansion of peoples, the location of cities and national boundaries.

Plains with favorable climate and fertile soils are closely related to the density of population, the growth of cities, and the development of national power. Sometimes the presence of favored plains contributes to the start of aggressive wars and accounts for the routes followed by invading armies. Deposits of coal, petroleum, and iron ore contribute to the location of industrial regions; and desire of nations to seize control of mineral resources appears to have been a factor in starting the world wars and the routes subsequently followed in several military campaigns.

A knowledge concerning the comparative size of countries and regions,

advantages and disadvantages of their climate, coastline, relief features, soils, minerals, and development are important in evaluating the power of a country and the industrial capacity of its people.

World Geography.—World geography has much of both cultural and practical value to offer students. Locational geography is usually stressed in this course, and such knowledge assists in interpreting and evaluating current events, especially those of international importance. Occurrences mentioned in the news mean little unless one knows the background. The course considers the various world regions, their resources, industries, cities, and life of the people and indicates how these factors affect the relationships of the nations and their peoples. Division into regions is based on different factors. One regional classification is based on differences of climate; another on relief features such as plains, plateaus, old, worn-down mountains, young rugged mountains, etc.; still another scheme is that of human use and is based on the industries or occupations of man. The first two examples would be static, the last is dynamic and the boundaries of regions subject to frequent shifts with the development of new industries or decline of old ones.

Economic Geography. — Economic geography summarizes knowledge about all leading foodstuffs, sources of raw materials, power resources, and location of manufacturing types and concentration of industries. The routes and methods of transportation, the character of exports and imports and the sources of these for the principal countries, ways by which an unfavorable balance of trade can be corrected, artificial stimulants and deterrents to trade are included in the subject.

Economic geography also deals with the possible future developments of industries and the changes logically to be expected in the trade of regions and countries. In the modern world, citizens in democratic countries can vote more intelligently and assist important political movements much better where they have a sound knowledge about the great commodities and know the facts about domestic and international trade.

Continent Studies.—A course in the geography of North America or of the United States alone, is the natural way of supplying desirable information about our country. Every citizen of the United States should know about the resources, the character and location of the population, the varied industries and other geographic facts concerning his country. Informed citizens have the knowledge needed to vote intelligently, to understand the problems of groups of people living in other parts of our country and engaged in different occupations, and the steps needed for the maintenance of our American democracy and living standards.

Continent studies outside North America provide information about sources of imports to the United States, markets for our exports, and the special industries of countries, the physical and climatic conditions encountered, the degree of development and the problems and life of their people. Such knowledge about other peoples helps us to understand them and their foreign and domestic policies. We may not agree with the atti-

tudes of certain peoples and countries but it is helpful if we do know the reasons that underlie or have determined certain policies. The more that the citizens of America know about Asia, Europe, and Latin America and their people, the better we can evaluate the probable effectiveness of our own foreign policies.

The Pacific realm is another area of increasing importance about which too little is generally known.

Historical Geography of the United States.—Both natural and human factors have contributed to the development of Americans and of the American institutions and way of life. Peoples of various cultures, ideas, attitudes, and political beliefs immigrated to America, and there they and their descendants came under the influence of various geographic factors which modified their original customs, attitudes, and ideas about government and social relationships, until the New World residents became Americans with a characteristic way of life, and possessed of certain ideals and concepts that constitute American democracy.

Among the natural factors affecting Americans during our period of development were: that of isolation or remoteness which favored local developments and less dependence upon the homeland; the abundance of land which favored the individual settler; the frontier conditions of life; the climate and its vagaries; the resources of minerals, forests and wildlife; the surface features; and the streams, lakes, and ground water resources. Among the human factors were the racial and cultural background of the immigrants, the peculiar genius of certain individuals, and the institutions—religious, governmental and social—introduced into the New World.

Historical geography of the United States or geographic influences in American history deals with the development of our country from the colonization period to the present. It considers the progressive economic changes which various regions have undergone, the resource bases on which the industries of the past and present are built, the types of frontiers and of settlement, and the expansion of our country from ocean to ocean. In brief, the course considers the roots and bases of our democratic institutions, and the factors affecting our economic and political development, and our growth to the status of a great power. The abundance of land and other resources was of paramount importance in attracting settlers and in the development of the high standards of living that Americans enjoy compared with those of most of the rest of the world.

The characteristics of Americans and their typical democratic institutions result from the modification of the culture, physiques, ideas about government, and life in general of the immigrants and their descendants in the favorable environment of America. Such industrial methods as extensive machine agriculture rather than intensive farming by hand, the assembly line and exchangeable parts in machinery manufacture, and other labor saving processes are characteristic developments in the United States where machines and power have largely replaced handicrafts.

Conservation.—Conservation deals with many activities and resources that affect the welfare of our country and its citizens. Knowledge concern-

ing the resources of forests, minerals, soils, grasslands, waters, fish, birds, and game are necessary if they are to be properly managed or utilized and restored where possible after depletion. The vast natural resources of the United States made possible the growth of our country and this importance can only be maintained through sound conservation practices.

Some resources like forest, grasslands, soils, and fish are renewable under good management. Water power and certain minerals like clay, cement rock, and common salt are essentially inexhaustible. In contrast, the mineral fuels and metal' deposits are exhaustible and when used do not replace themselves. Soils when damaged by erosion and depleted by long cropping require many years for rehabilitation.

The generally high living standards in the United States are directly related to the abundance of natural resources and careful utilization of our resources, and wise conservation methods are needed for the maintenance of our American way of life. The industrial capacity and military might of our country depends both upon the available natural resources and the intelligence and resourcefulness of our citizens.

Certain resources of the United States have been materially depleted, notably soils, forests, underground water supply, wildlife, and certain minerals. Where feasible our supplies of these must be rehabilitated or substitutes developed if the most important resource of the country, the people, are to maintain and improve their health and vigor.

Essential and Strategic Resources. —It is of great importance to any program of economic self-sufficiency for the United States to produce or have access to a large variety of resources. In ordinary times foodstuffs, raw materials, and manufactured goods which are lacking in the United States can be secured from various parts of the earth, but during war, goods are no longer free to move in their usual channels. Furthermore, there is increased consumption of materials under war conditions so that resources which would ordinarily be adequate are no longer sufficient for our needs.

Commodities used in a preparedness program for a country can be classified into strategic, critical, and essential materials. Strategic materials are those which come wholly or substantially from outside the country; critical materials are produced, but not enough for our needs; essential materials are those required for national defense but neither strategic nor critical. Examples of strategic materials are: tin, nickel, chromite, quartz crystal, manila hemp, cinchina bark, rubber, silk and kapok; critical includes aluminum, tungsten, quicksilver, asbestos, scientific glass, nitrates, wool, and paper pulp. Some essential materials are: iron, copper, lead, zinc, cotton, sulfuric acid, petroleum, meat, and grains. The vast international trade which was developed between the producers and consumers of strategic and critical materials, is of great importance to business during times of peace and vital to national security during wartime.

General methods for alleviating a scarcity of raw materials include: (1) efforts to find new sources, (2) accumulating a stockpile of strategic and critical materials, (3) encourage production in other accessible countries; (4) expand recovery of scrap and

other waste, (5) discover possible substitutes, and (6) control the price, distributions, and use of materials.

Political Geography.—Interest in political geography which deals with the past and present political problems of the world, has greatly increased, both during the war years and since. An understanding of the subject is primarily based on the physical, economic, and human geography of nations. The size, shape, population, climate, character of coasts, routes of transportation, nature of boundaries, neighbors, the minerals, forests, and other natural resources, soil productivity, industries, and degree of development of a country are among the topics to be considered.

In evaluating the power of a nation the resources it lacks are of great importance. Lack of petroleum, steel, copper, and numerous other essentials may greatly handicap a nation at war unless it can continue to import such products. Japan and Italy were under great handicaps during World War II for lack of numerous minerals and other strategic materials.

Human factors are likewise important to a nation, for example, whether different ethnographic groups live together amicably or constitute a continual cause for turmoil and misunderstandings among the residents, as in Palestine. Sometimes geography has been prostituted in an attempt to give a logical explanation for aggression by powers against their neighbors as in the case of Nazi Germany and Japan, who used the so-called science of geopolitics for their own sinister purposes.

In political geography there is usually emphasis upon a state's contemporary territorial problems, both domestic and foreign, including border disputes and colonial affairs.

In many parts of the world there are conflicting tendencies between the desire for local autonomy on the part of certain groups and the efforts made by other groups of people or by a powerful state toward national unity and territorial expansion. Even world unity is sought for by many. Political geography seeks to weigh the advantages and disadvantages of local governments, in contrast to empires, both in the effect on the people of a state and the influence to be exerted by a state in its relations to other nations of the world. If consolidation of states occurs and centralization of government develops, those enlarged countries will have the best chance to survive which adapt their political functioning to regional and cultural differences among their population. The potentialities of human and natural resources can be attained best in those states where each ethnic group and local community makes its particular contribution to world culture and economy.

In war a nation which hopes to remain free must adapt its defense to the terrain, transportation, resources, and other natural factors as well as possess loyal citizens and efficient government working together for the good of their country. Large populous states usually have the means of achieving an integrated economy and adequate protection against enemies, but intelligent co-operation between all its people and nationwide adjustment to the natural environment are essential for the maintenance of a free democracy.

College Offerings in Geography.—The offerings in geography given by institutions of higher learning have increased in recent years but there is still opportunity for further expansion in this field. A study of the 1947-48 catalogs of 1,015 universities, liberal arts colleges, and the colleges of education, shows that about 60 percent of these institutions offer one or more courses in geography. However, only 257 of these higher institutions of learning, about one-fourth of the combined number, offer sufficient work to satisfy requirements for an undergraduate major in geography.

In these institutions which provide for a major in geography, practically all offer elements of geography, economic geography, North America, South or Latin America and Europe. Nearly three-fourths offer Asia, but only one-sixth give work on the Pacific area and only 9 percent on the U.S.S.R. as a separate course. Conservation is taught in 60 percent, political geography in 48 percent, and historical geography of the United States in 27 percent of the colleges and universities which offer a major in geography.

Remembering that the institutions at which a student can thus major in geography constitute only one-fourth of the colleges and universities, it would seem that an expansion in the offerings of geography at the collegiate level would be helpful for both practical purposes and for cultural use. One cultural purpose would be their use in helping to explain the development of American democratic institutions and the heritage of moral virtues and ideals of the American way of life.

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The editor has endeavored to point out the various aspects of speech and voice correction, and has chosen numerous collaborators well known in the field, to aid him in this task.

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